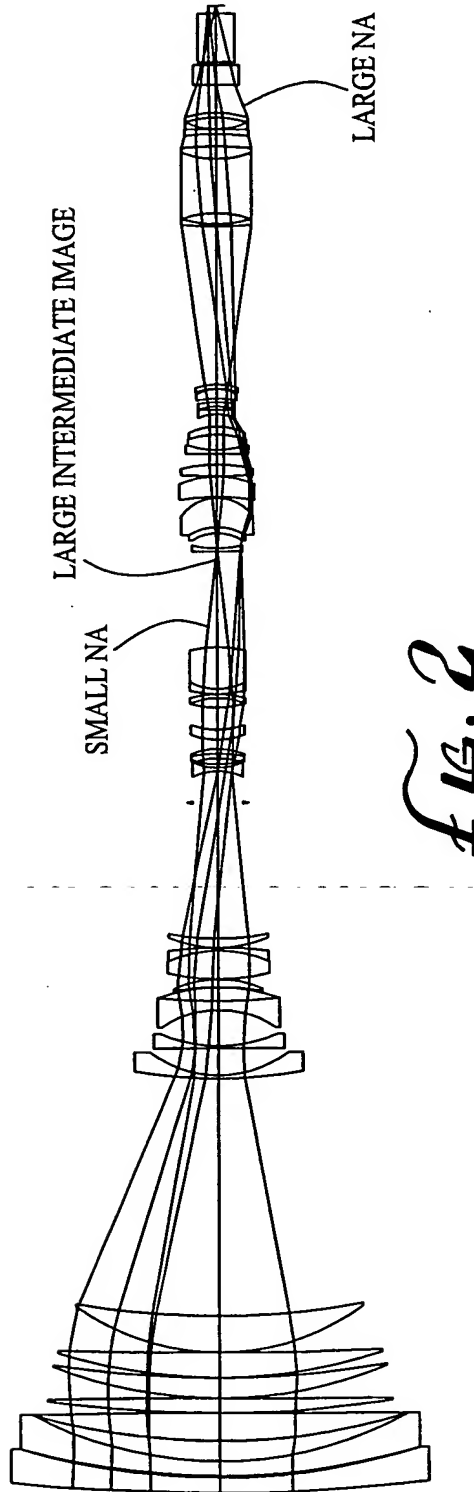
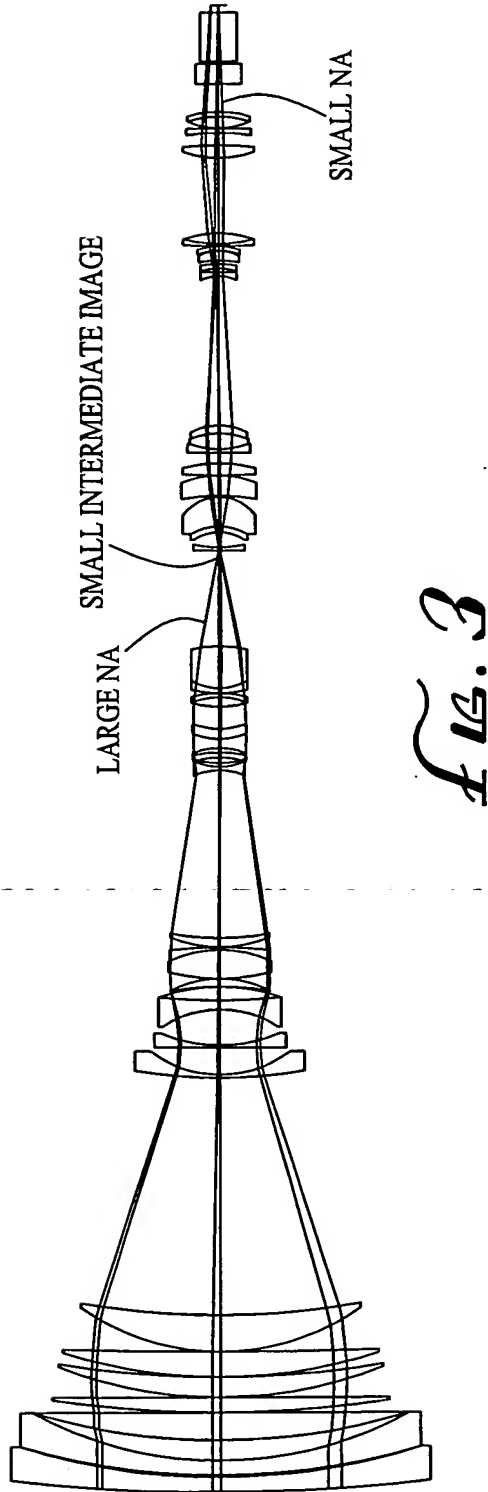
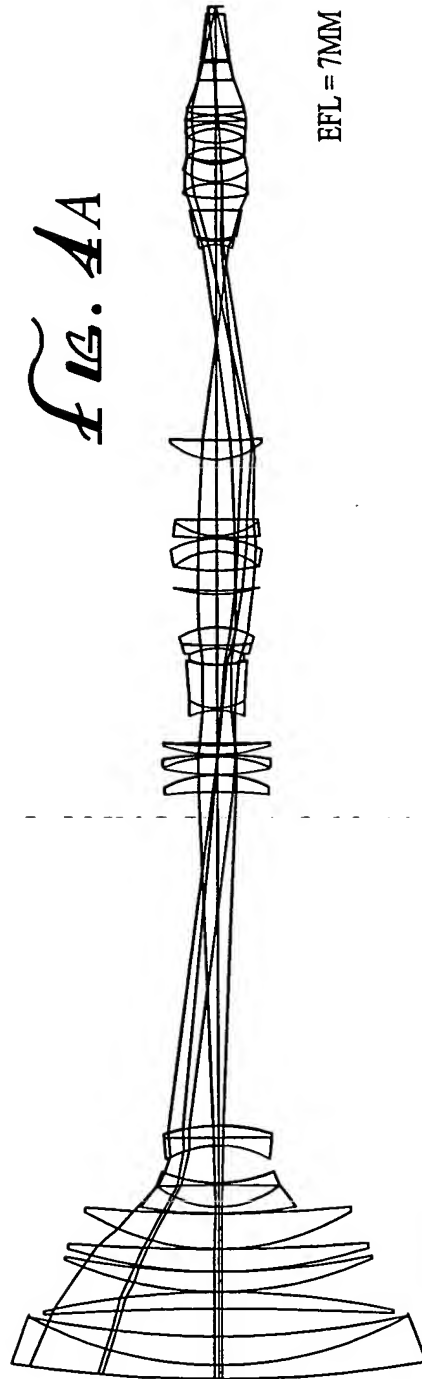


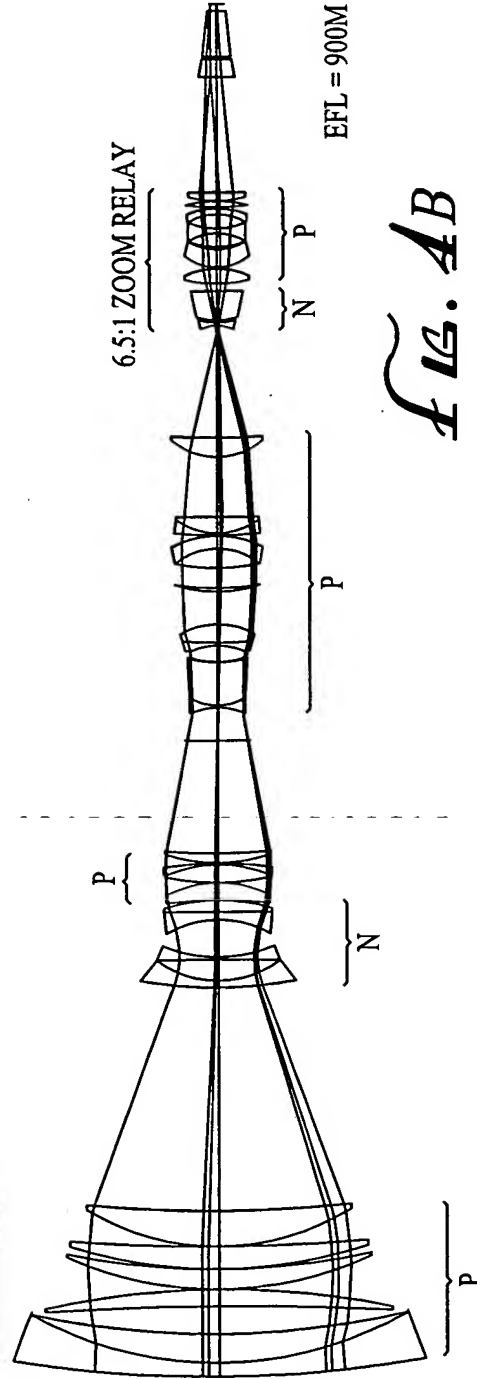
Fig. 1

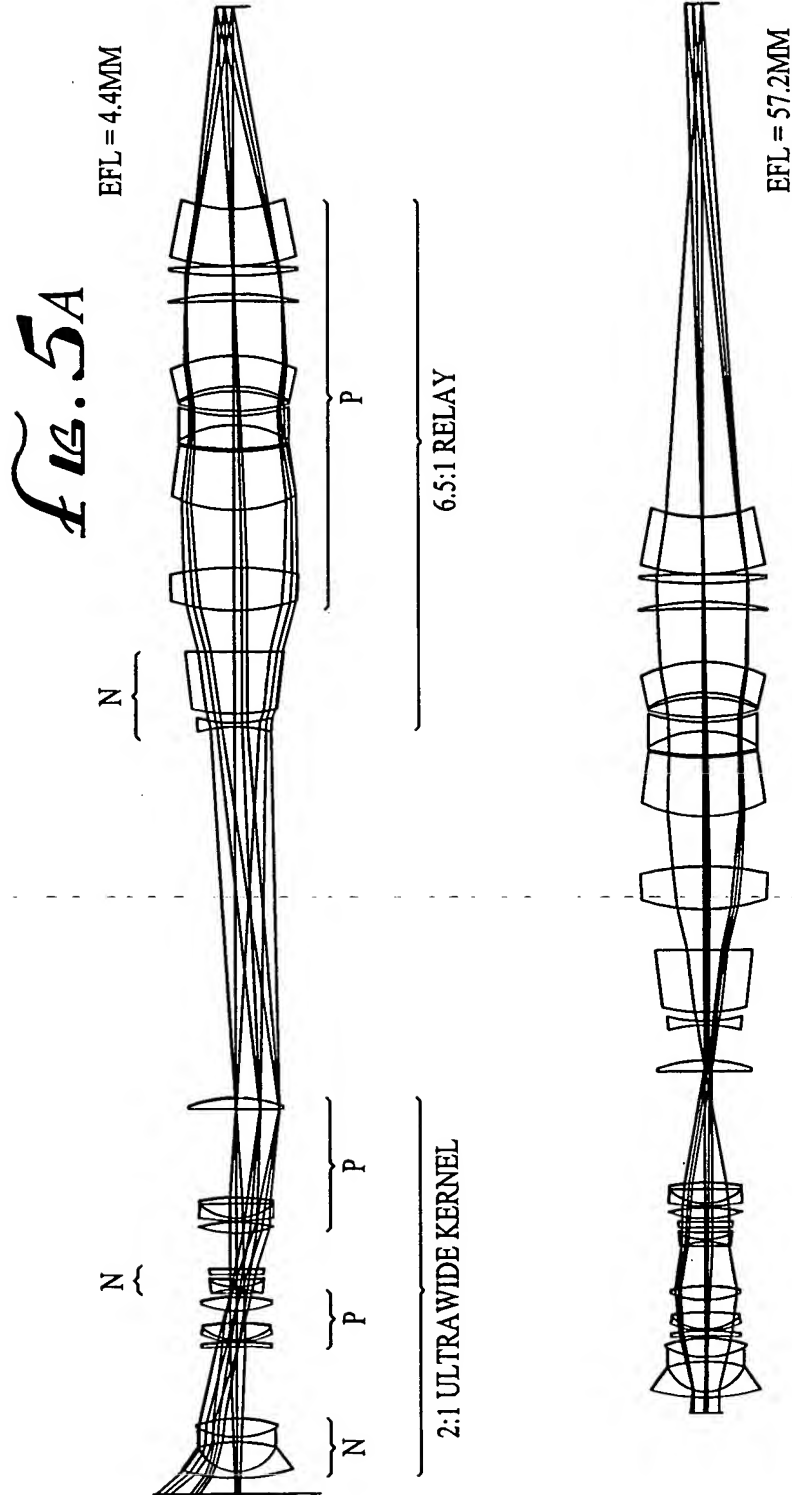


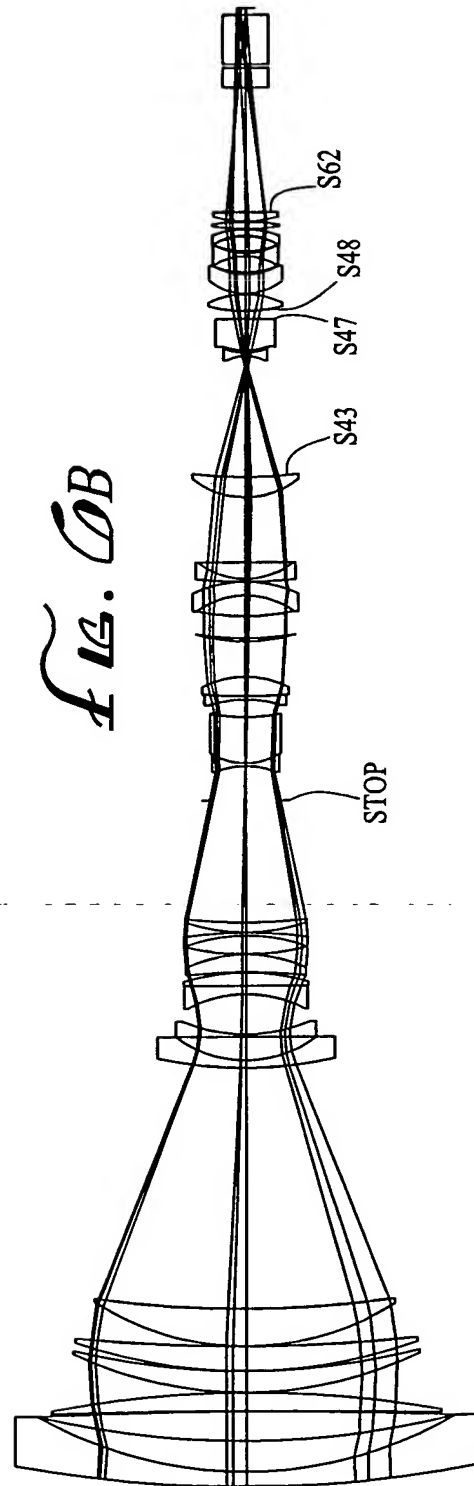
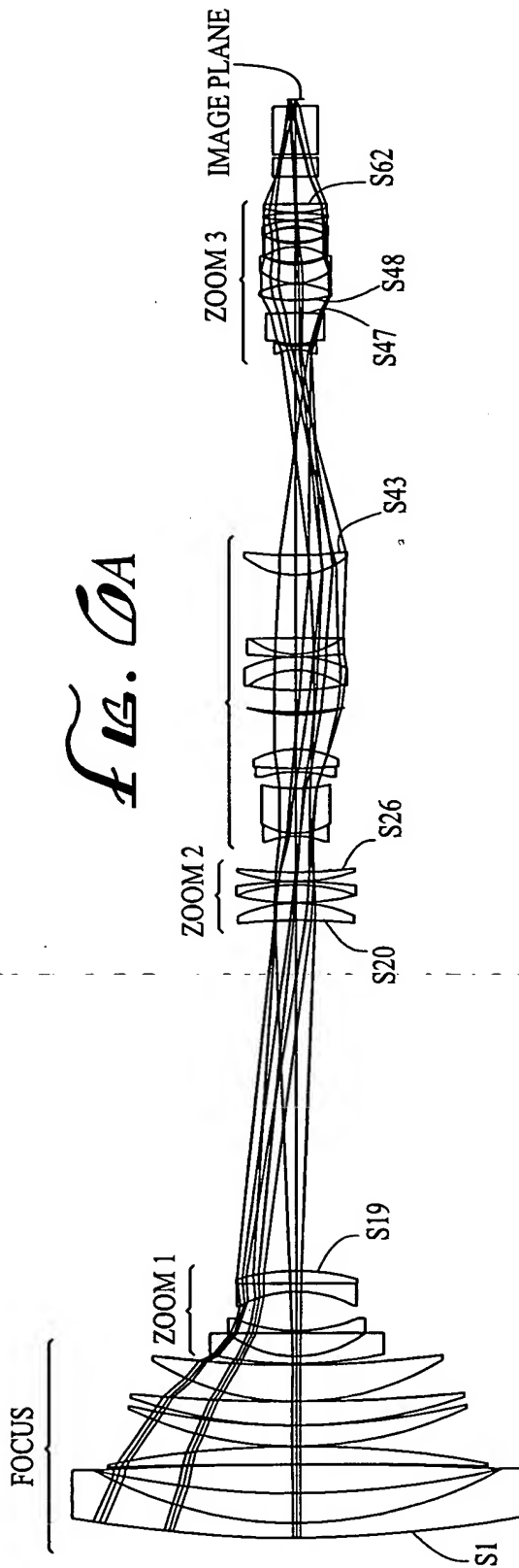


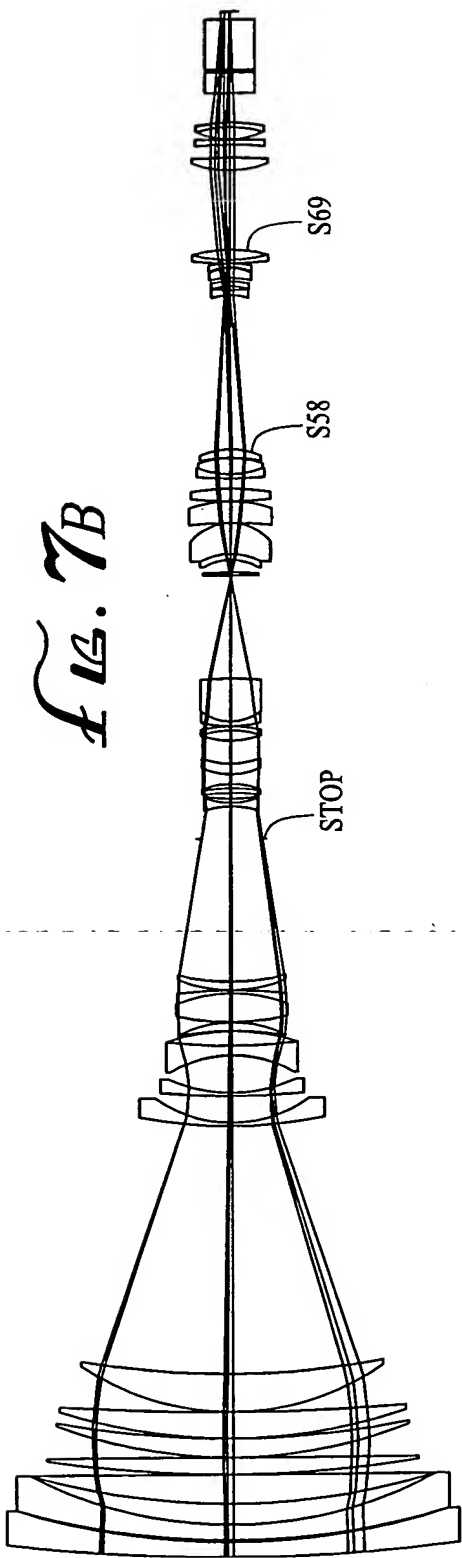
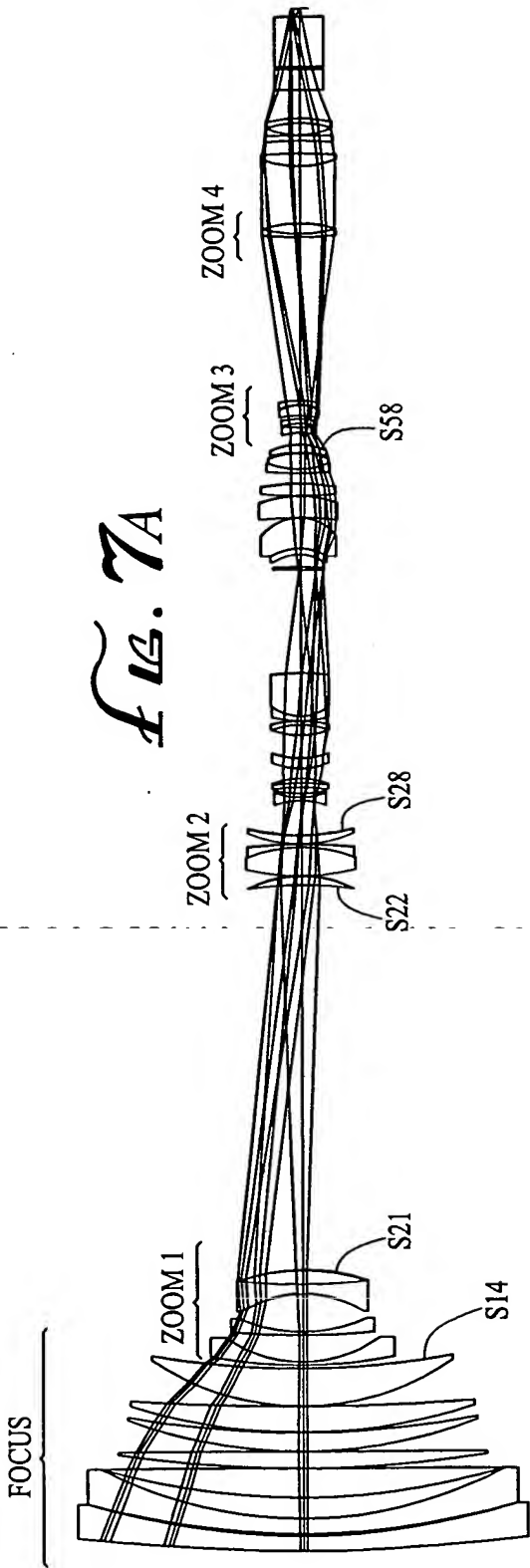


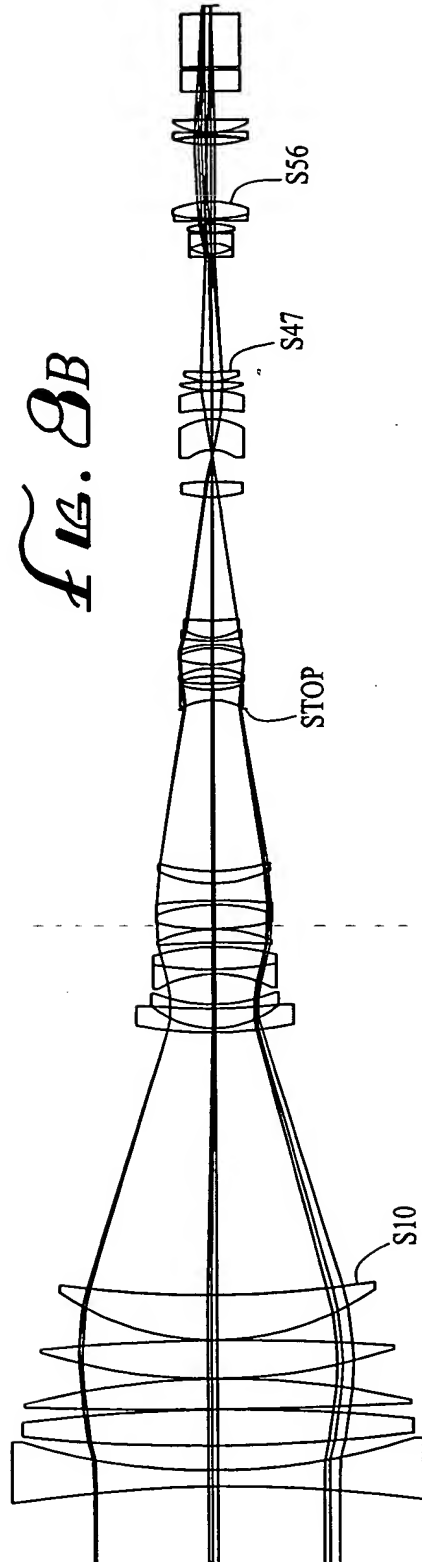
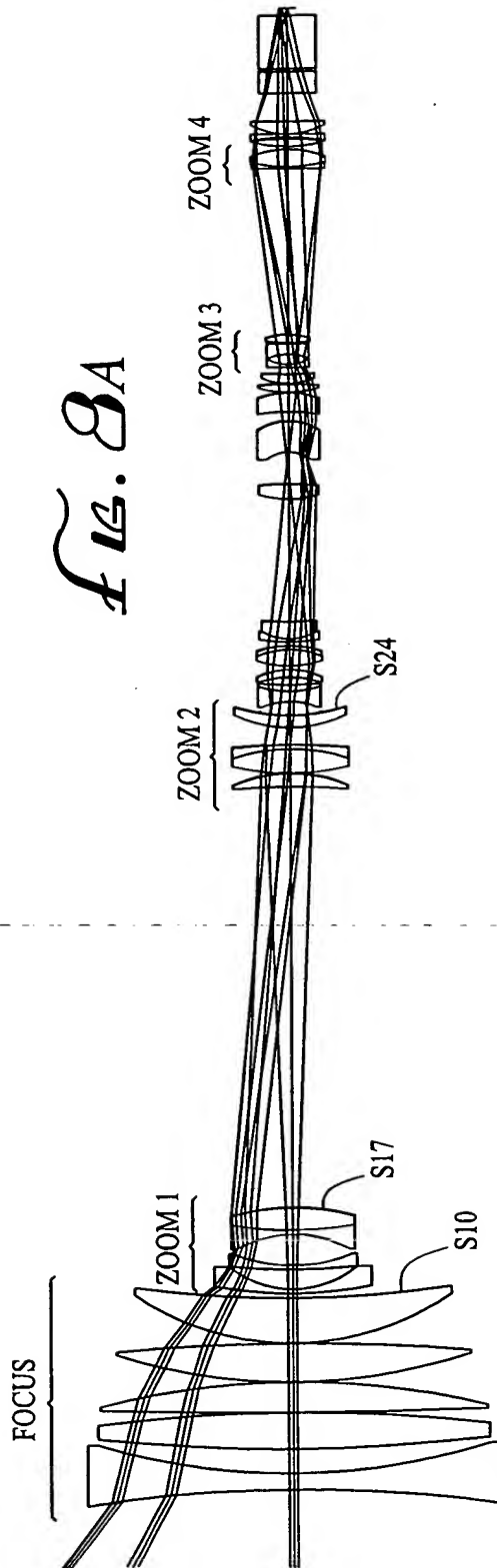
20:1 FRONT ZOOM LENS



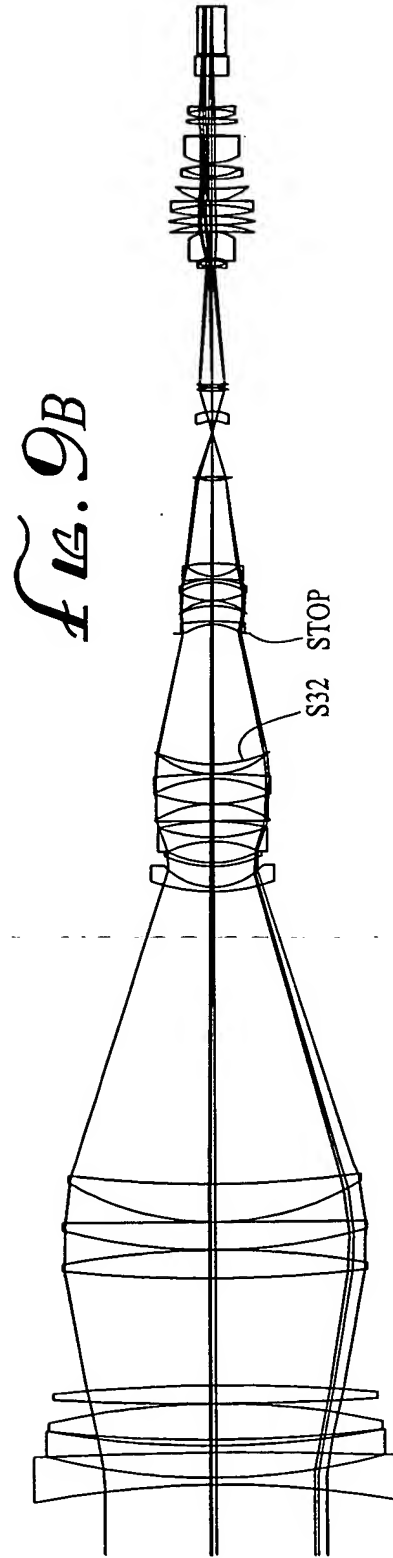
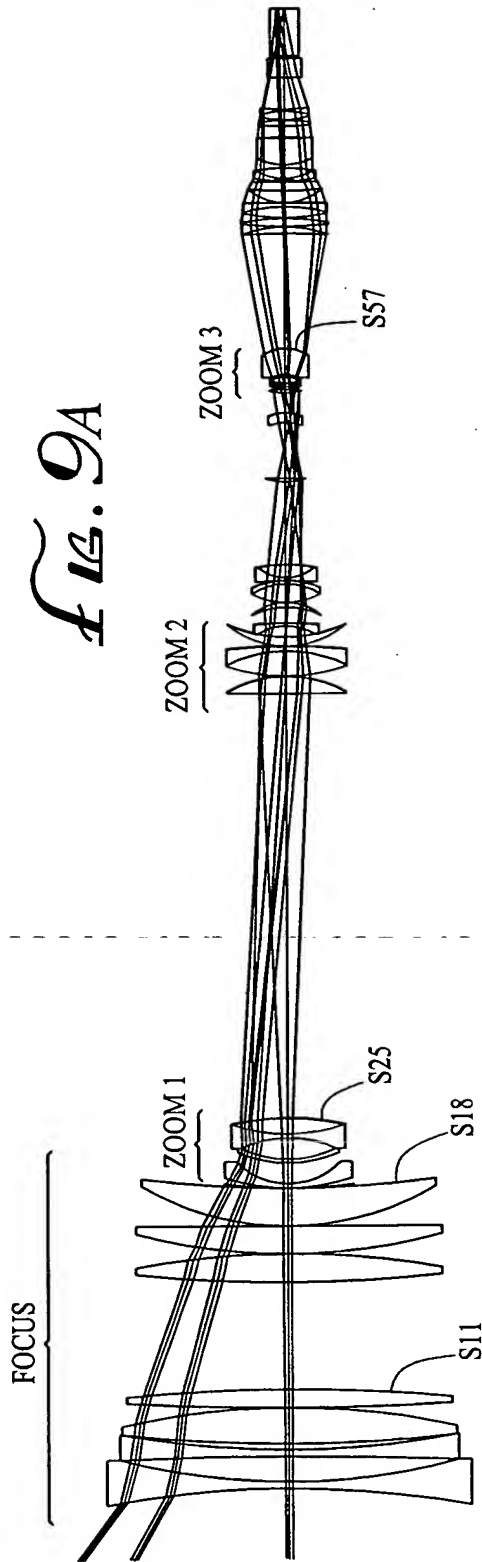


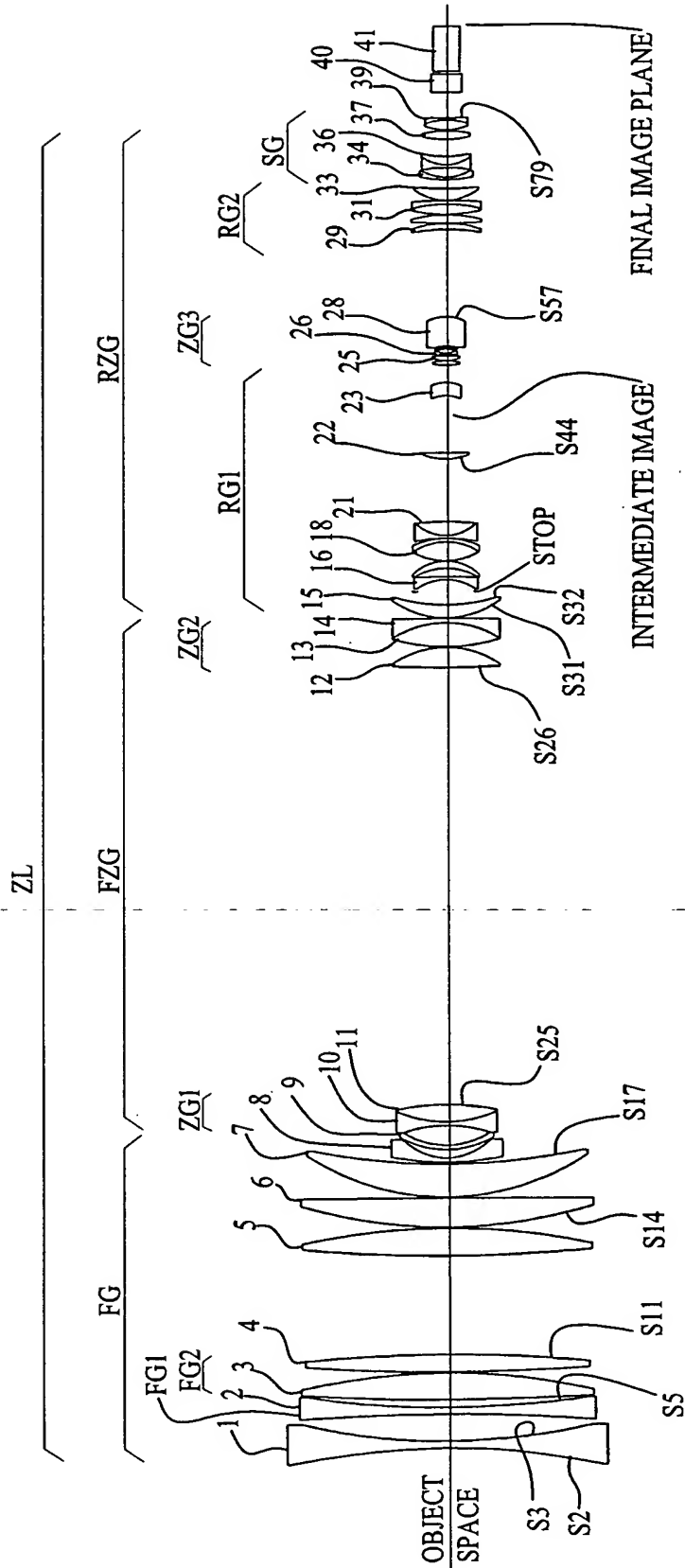












*FIG. 10*

POSITION 1

ZL

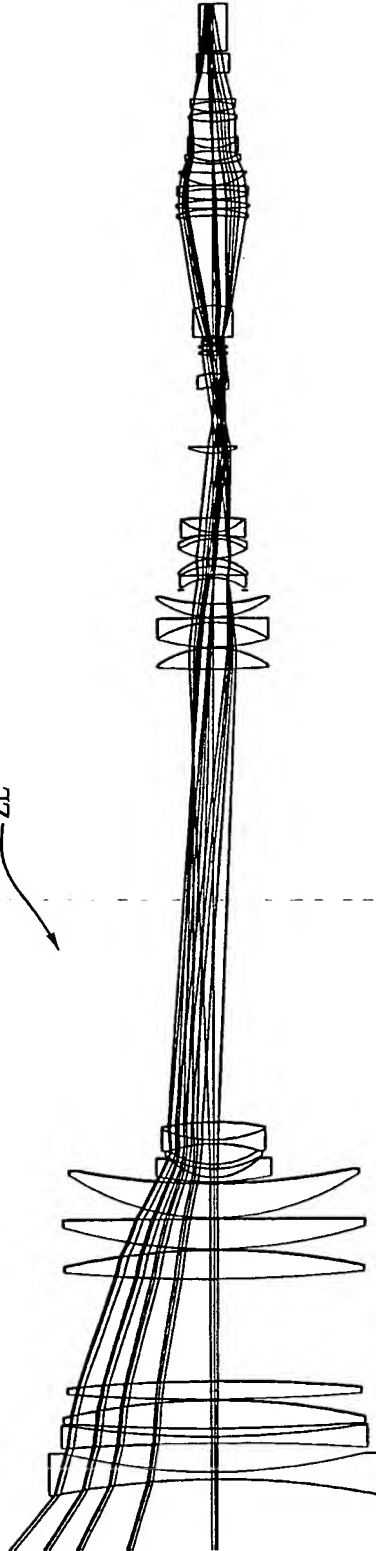


FIG. 11

POSITION 2

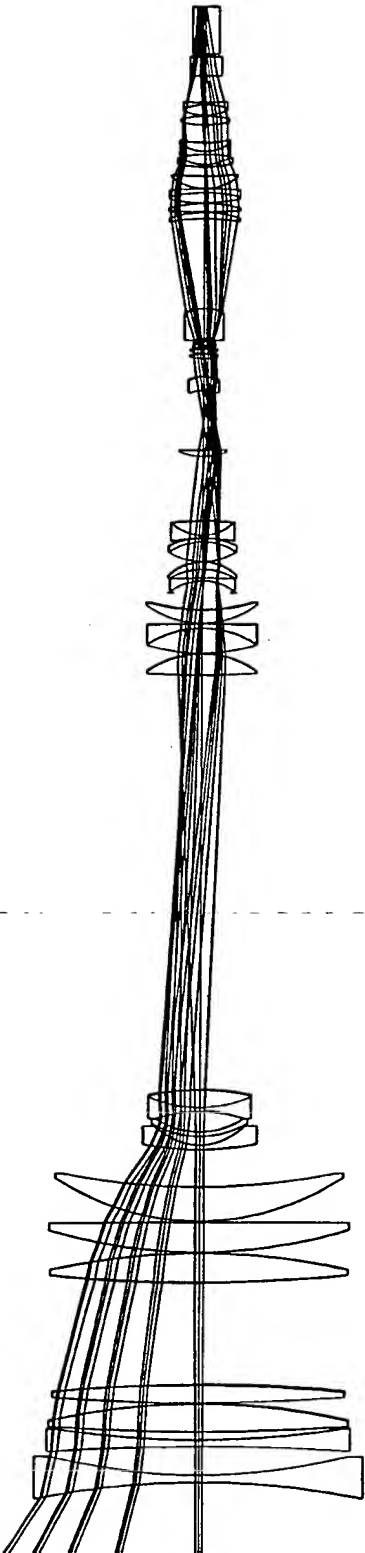


Fig. 12

POSITION 3

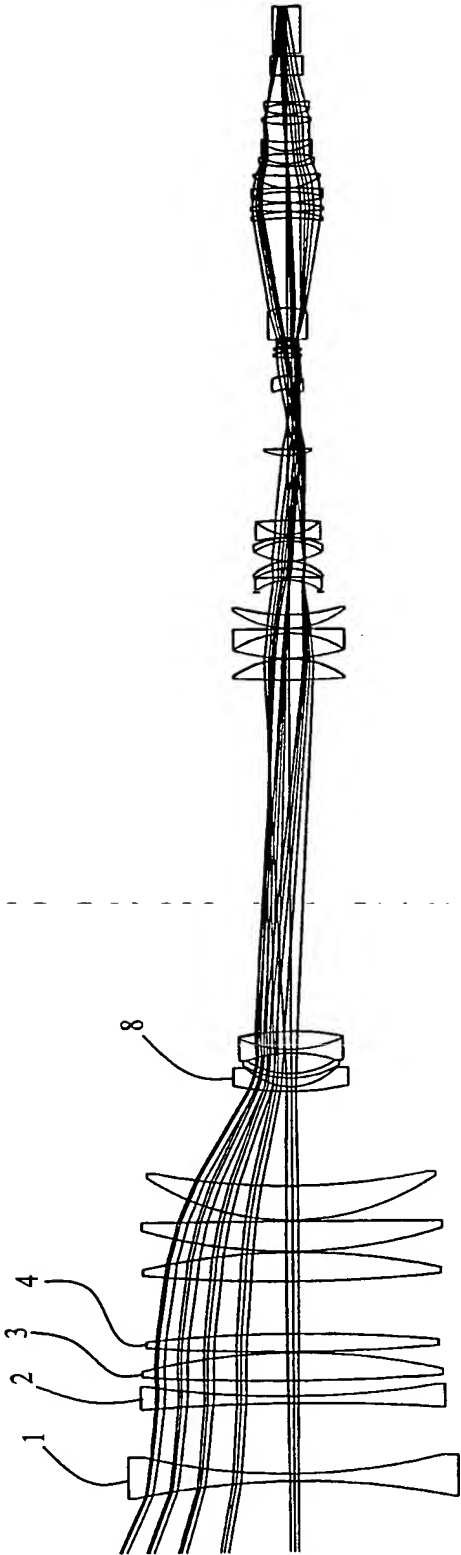


Fig. 13

POSITION 4

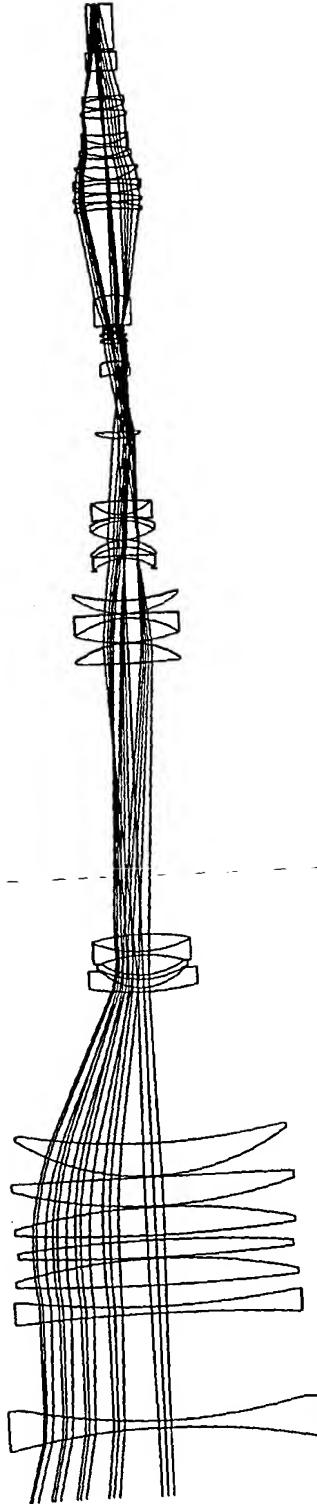


FIG. 14

POSITION 5

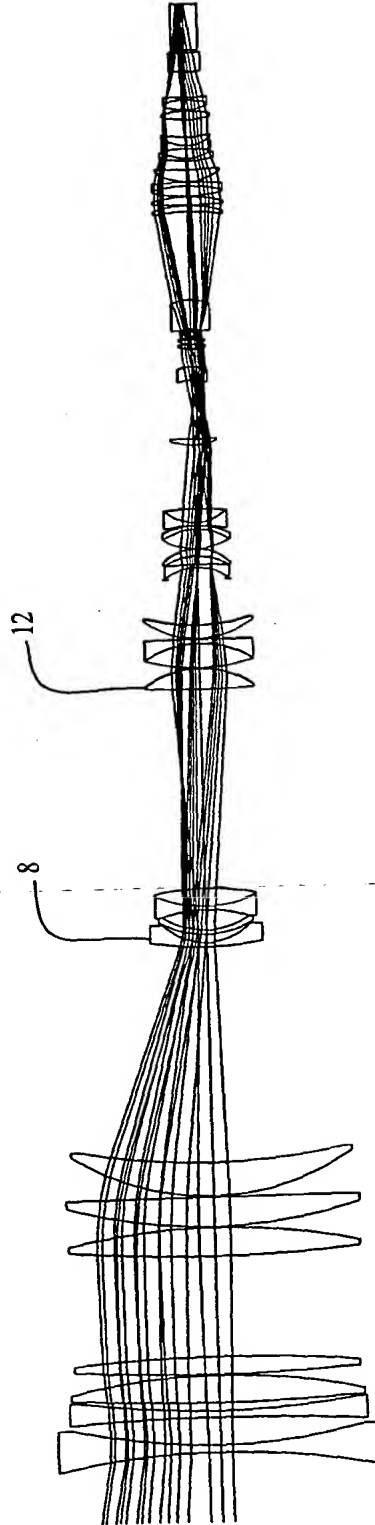


Fig. 15

POSITION 6

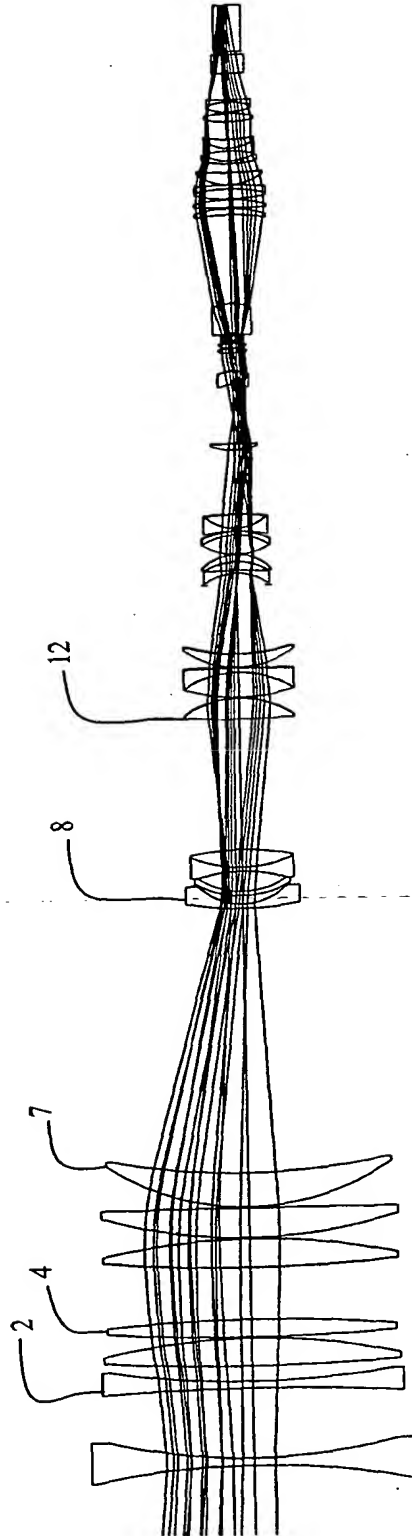


FIG. 10



POSITION 7

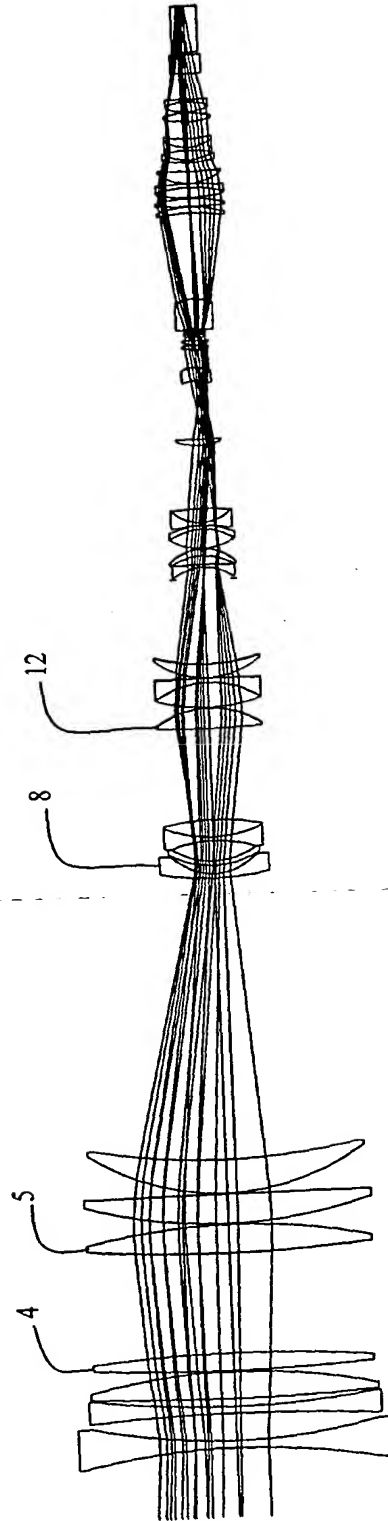


FIG. 17

POSITION 8

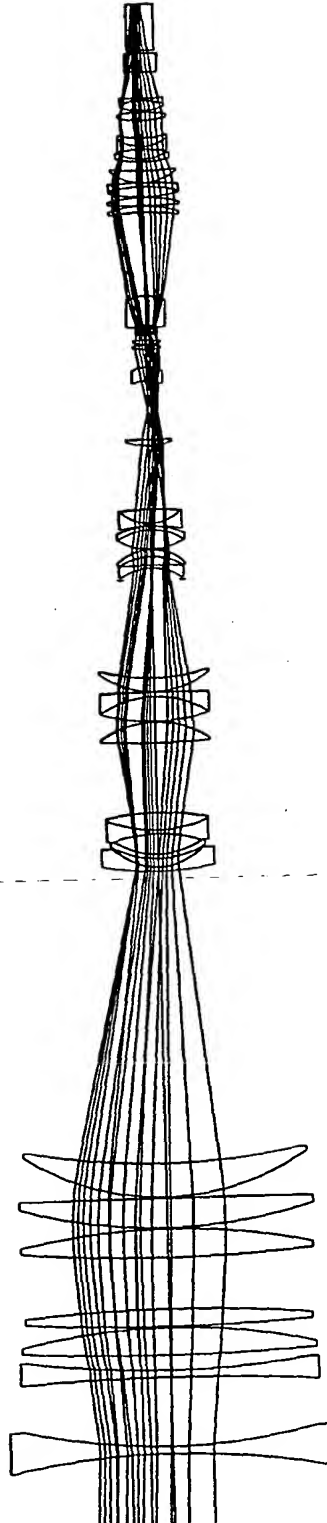
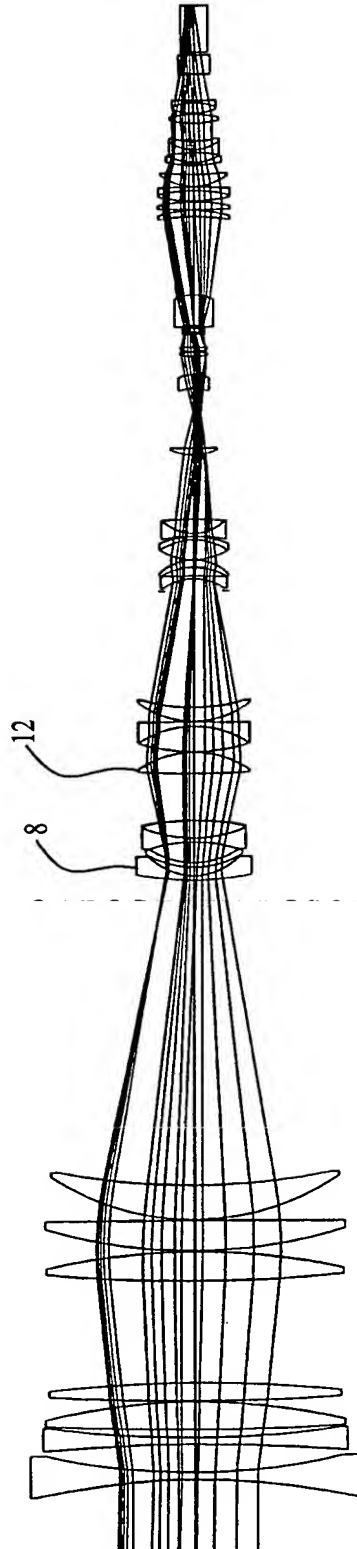


Fig. 18

POSITION 9



*Fig. 19*

POSITION 10

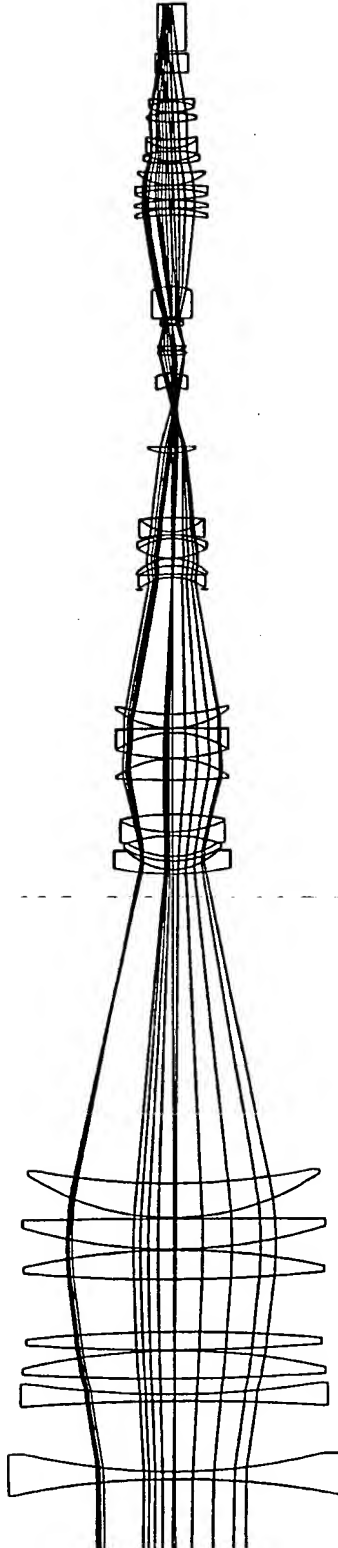


Fig. 20

POSITION 11

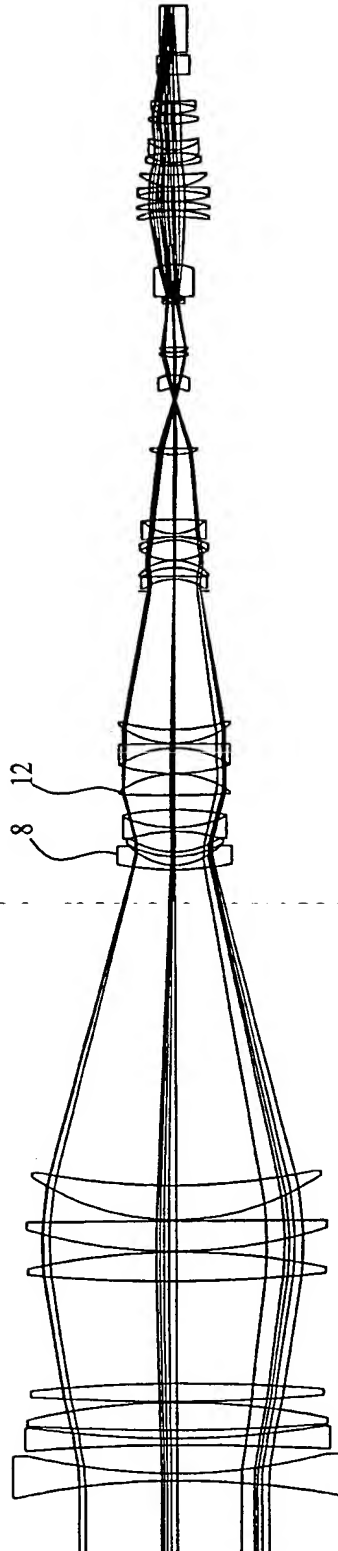


FIG. 21

POSITION.12

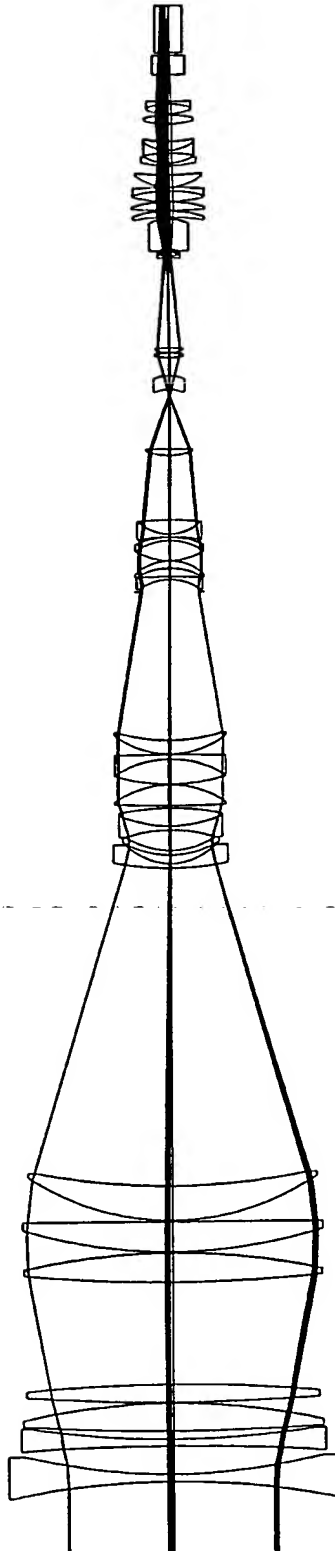


Fig. 22

POSITION 13

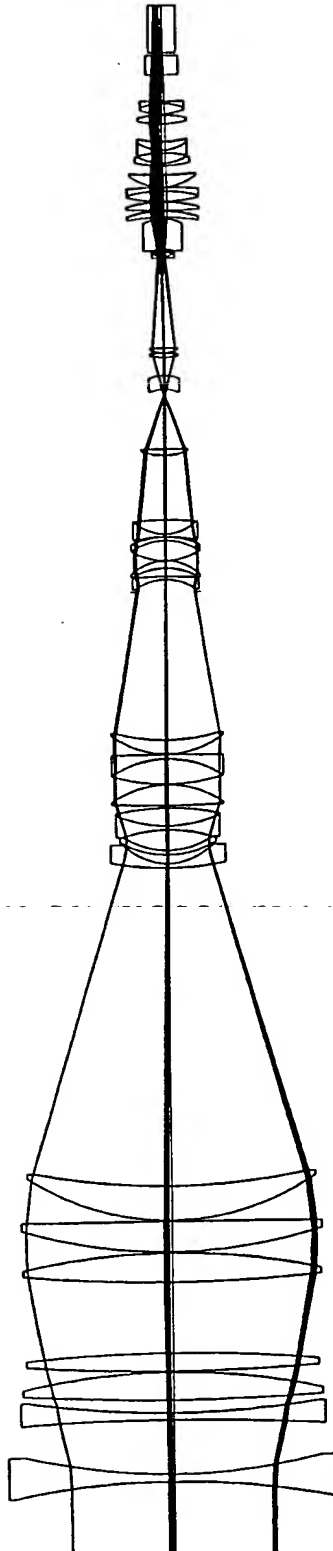


FIG. 23

POSITION 14

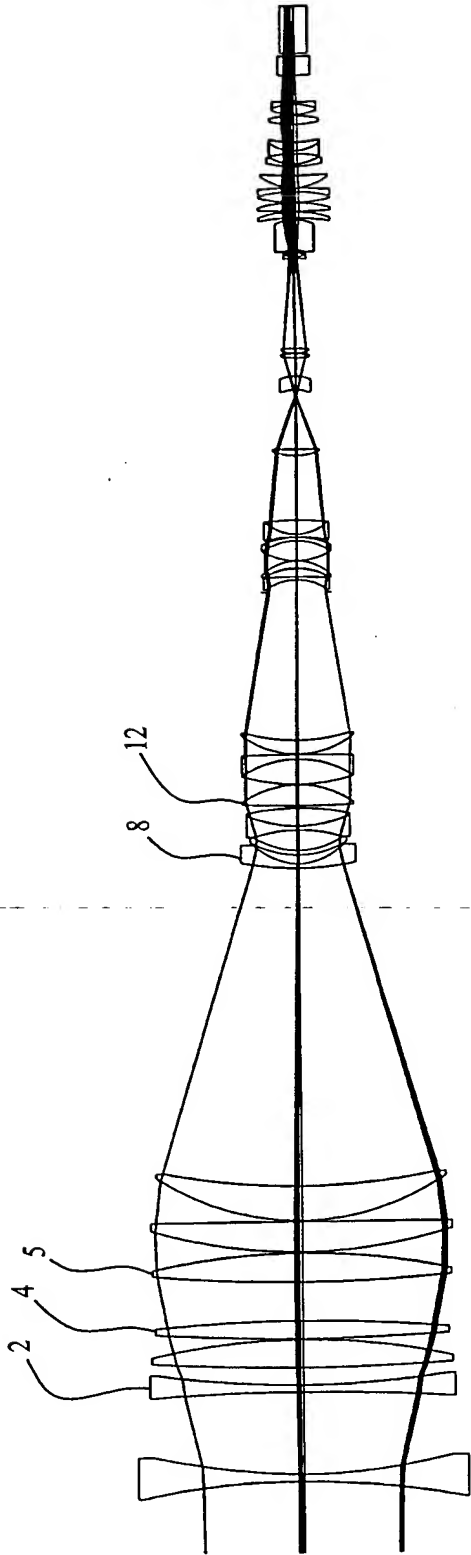


FIG. 24



POSITION 15

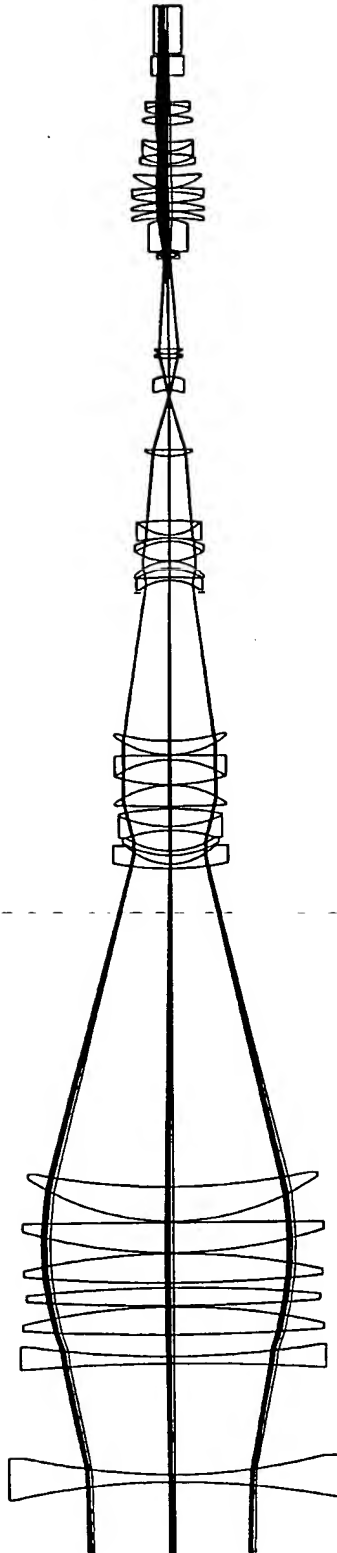


FIG. 25

POSITION 16

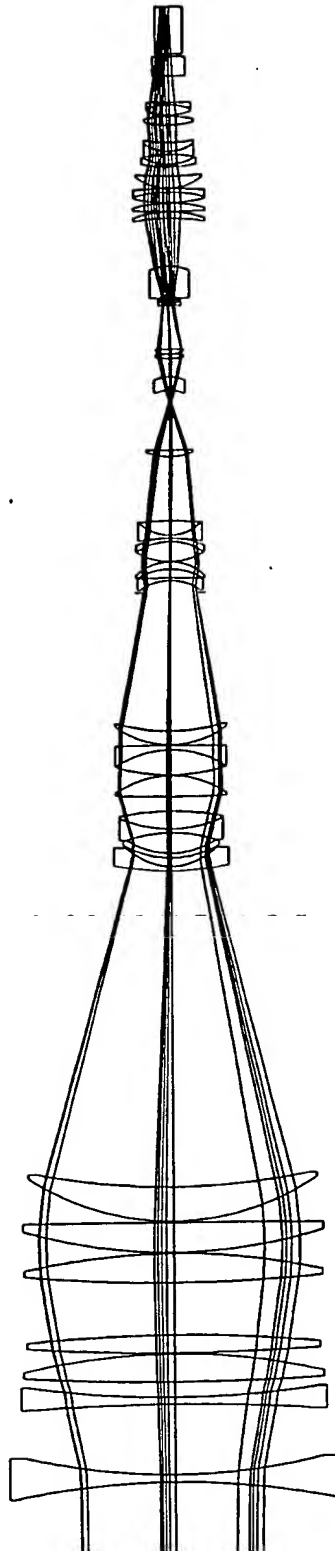


FIG. 20

POSITION 17

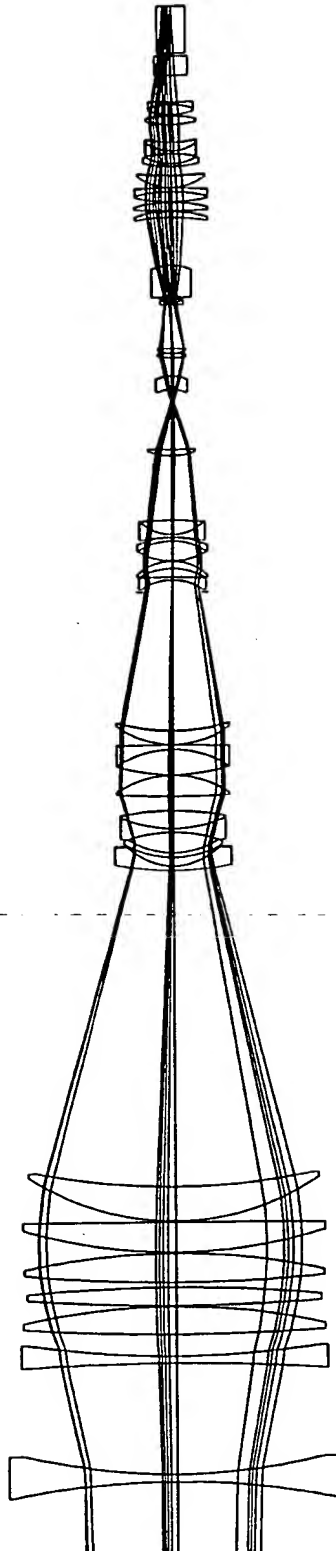


FIG. 27

POSITION 18

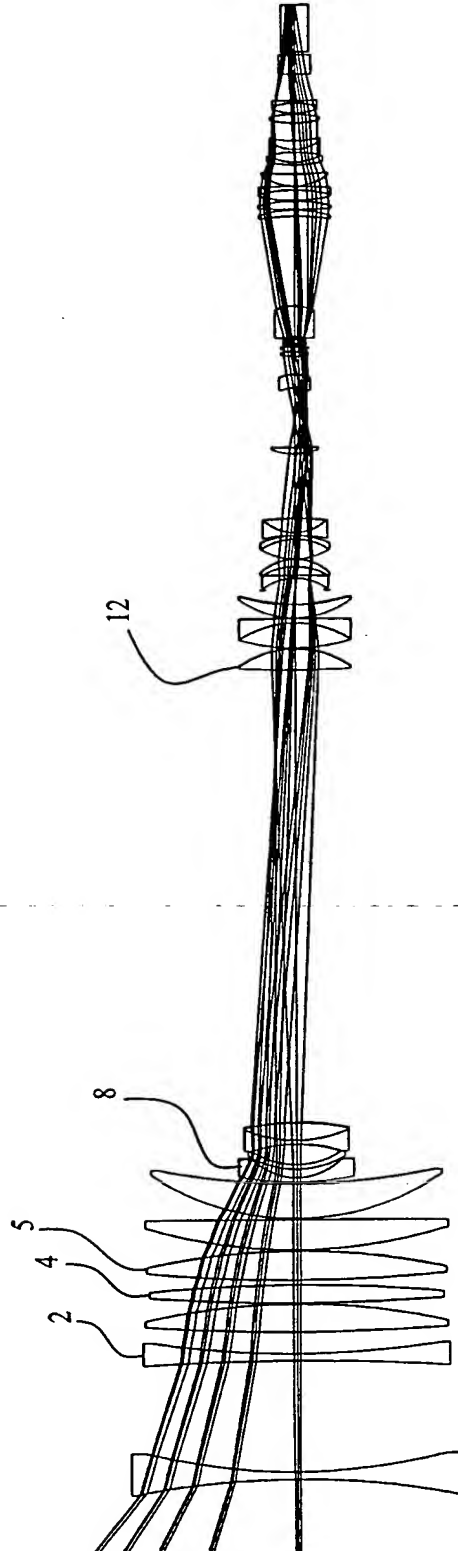
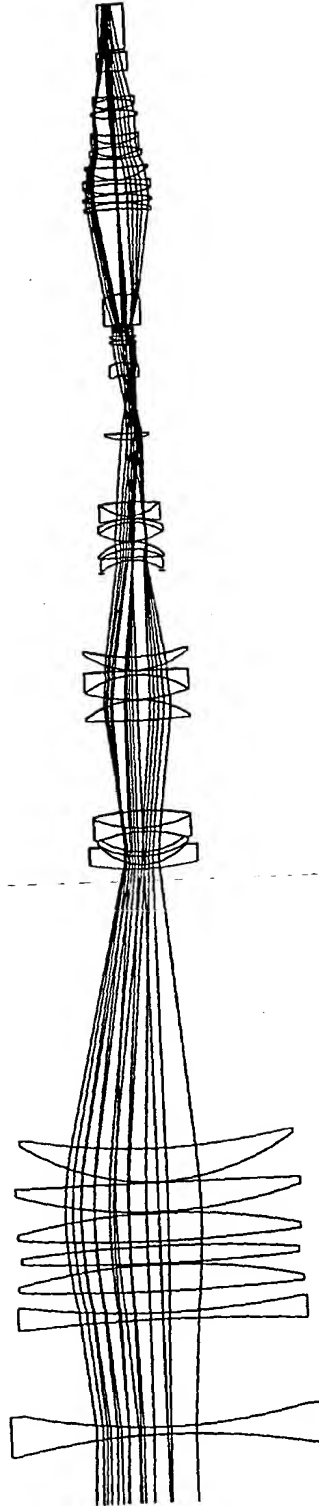


FIG. 28

POSITION 19



*f<sub>19</sub>. 29*

POSITION 20

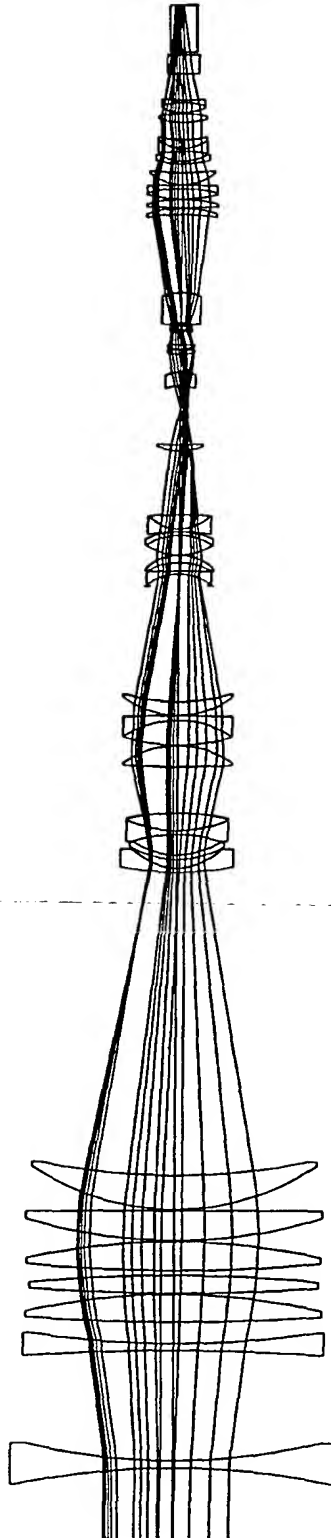
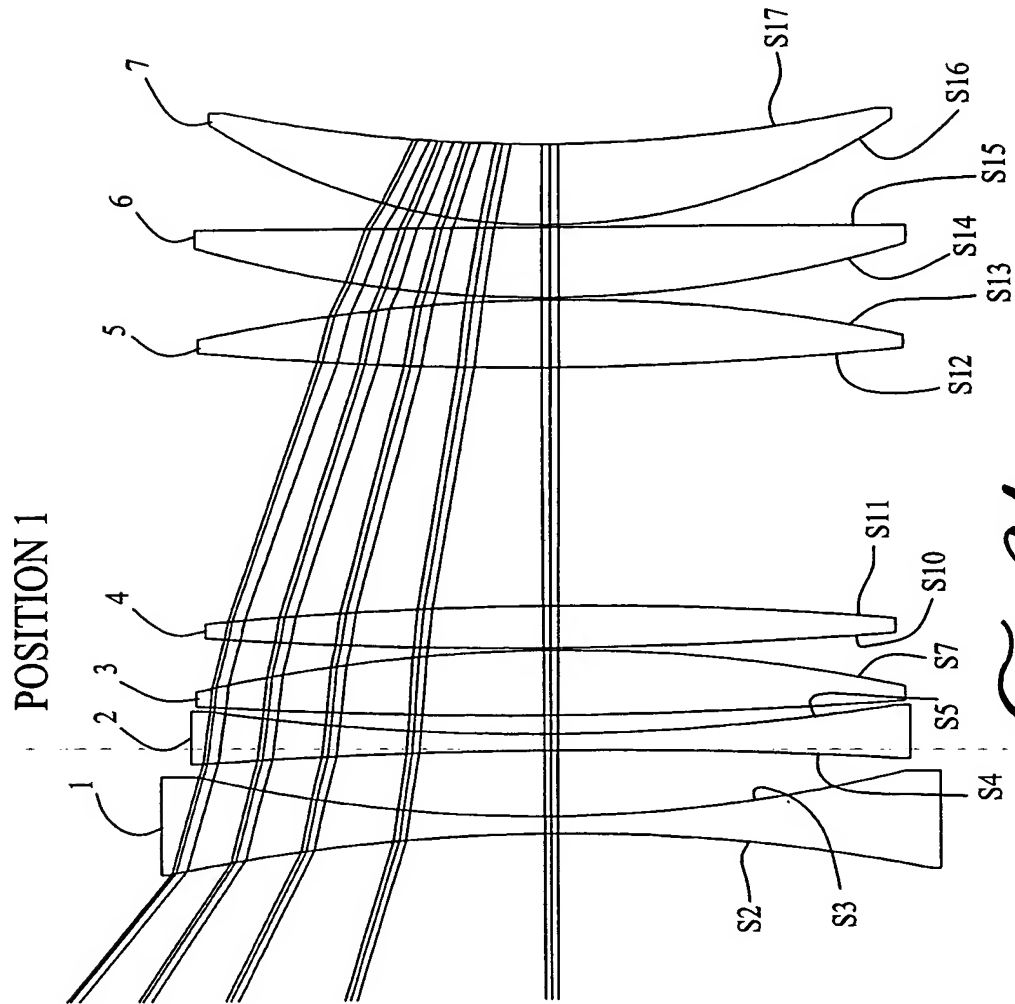


FIG. 30



*FIG. 31*

POSITION 18

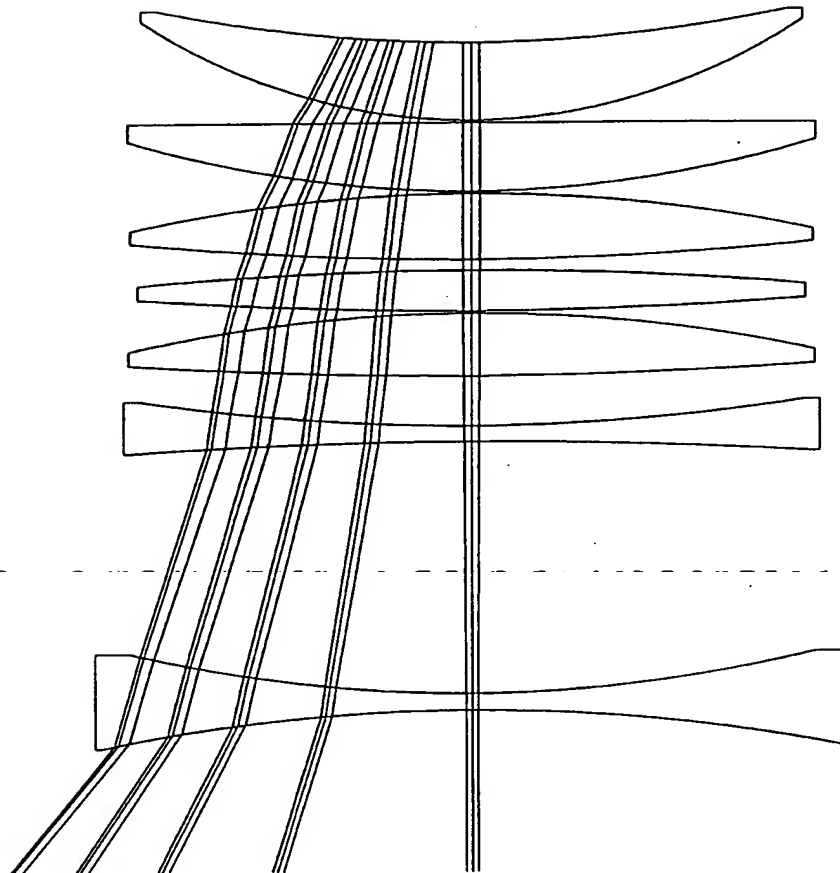


Fig. 32



POSITION 12

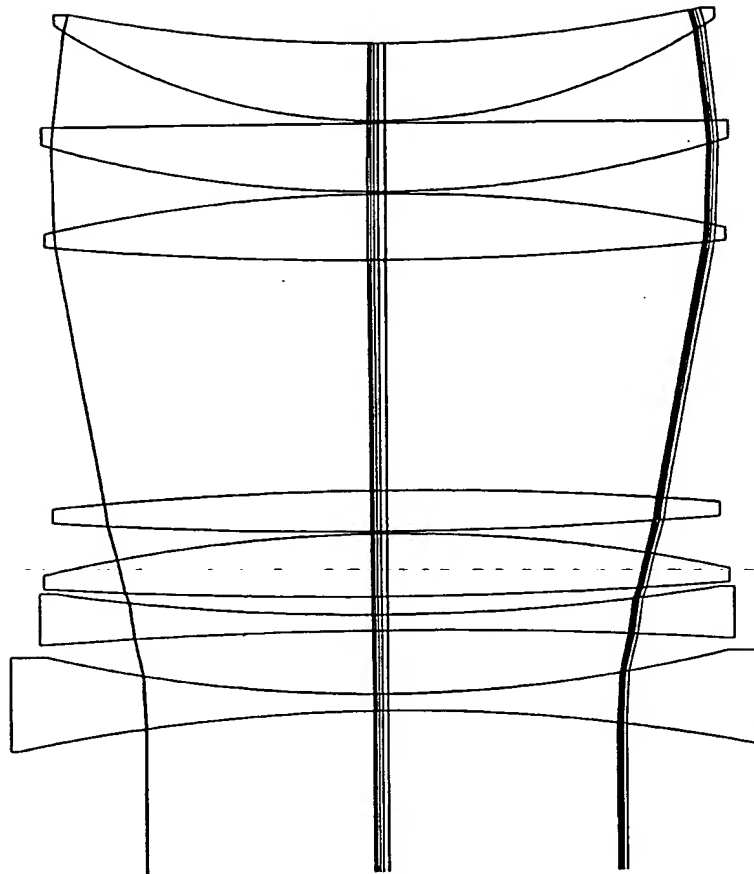


FIG. 33

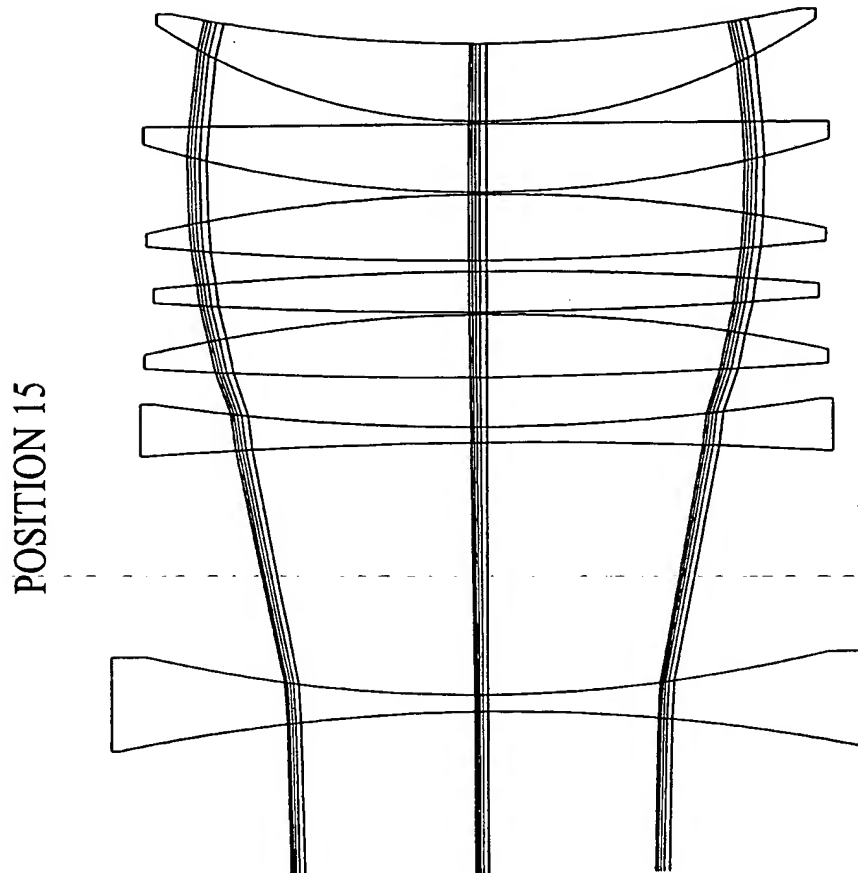


FIG. 34

POSITION 1

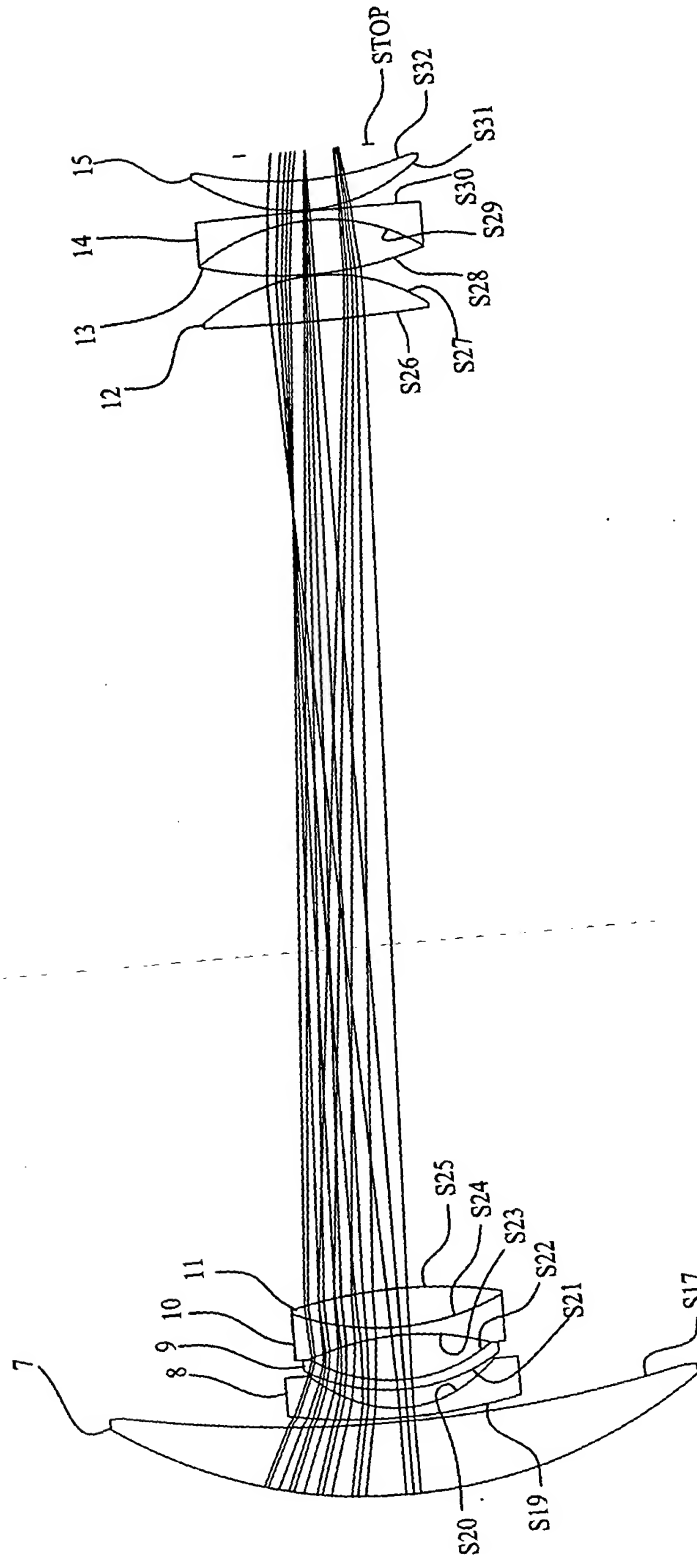


FIG. 35

POSITION 12

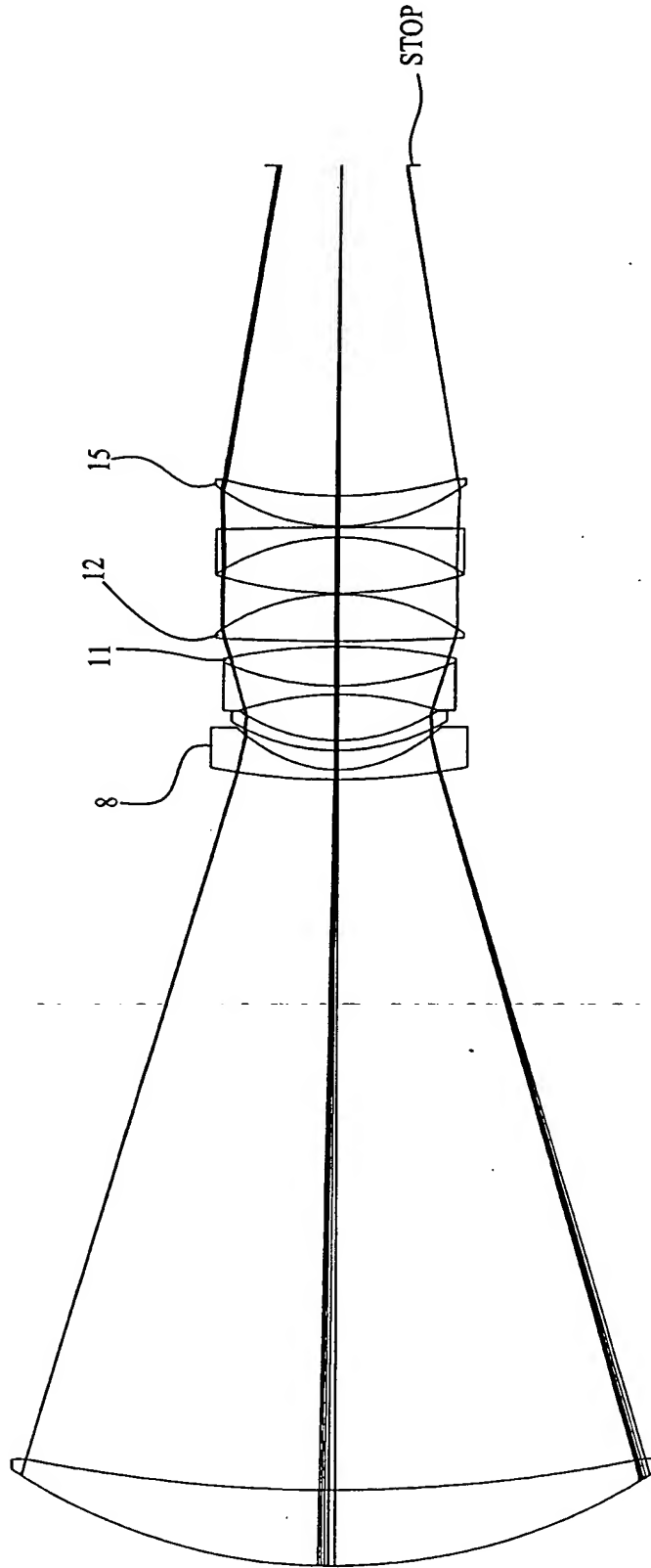


FIG. 30

POSITION I

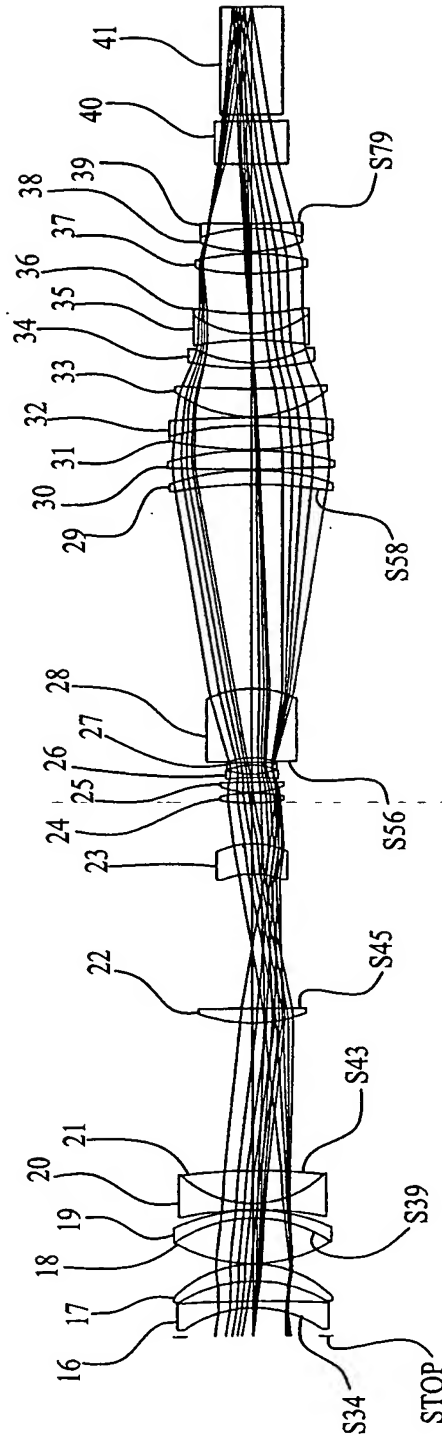


FIG. 37

POSITION 12

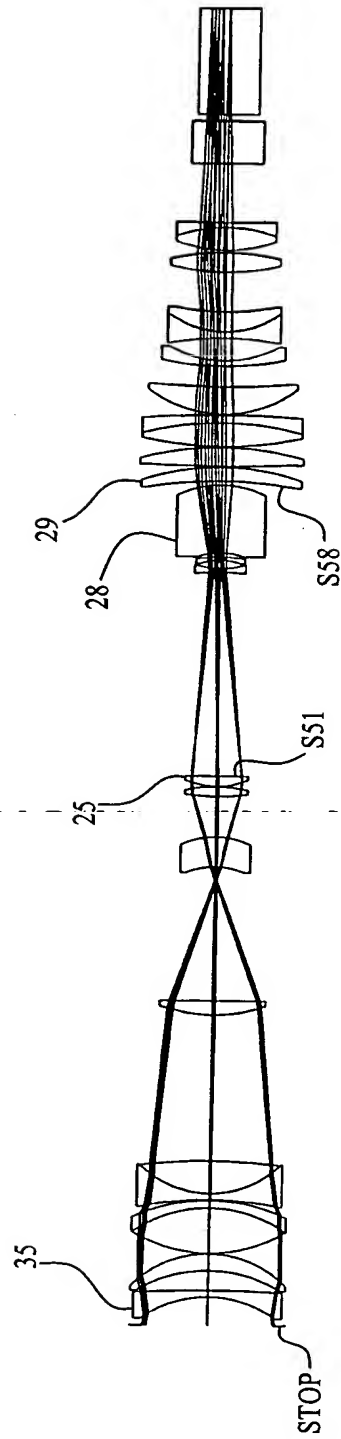
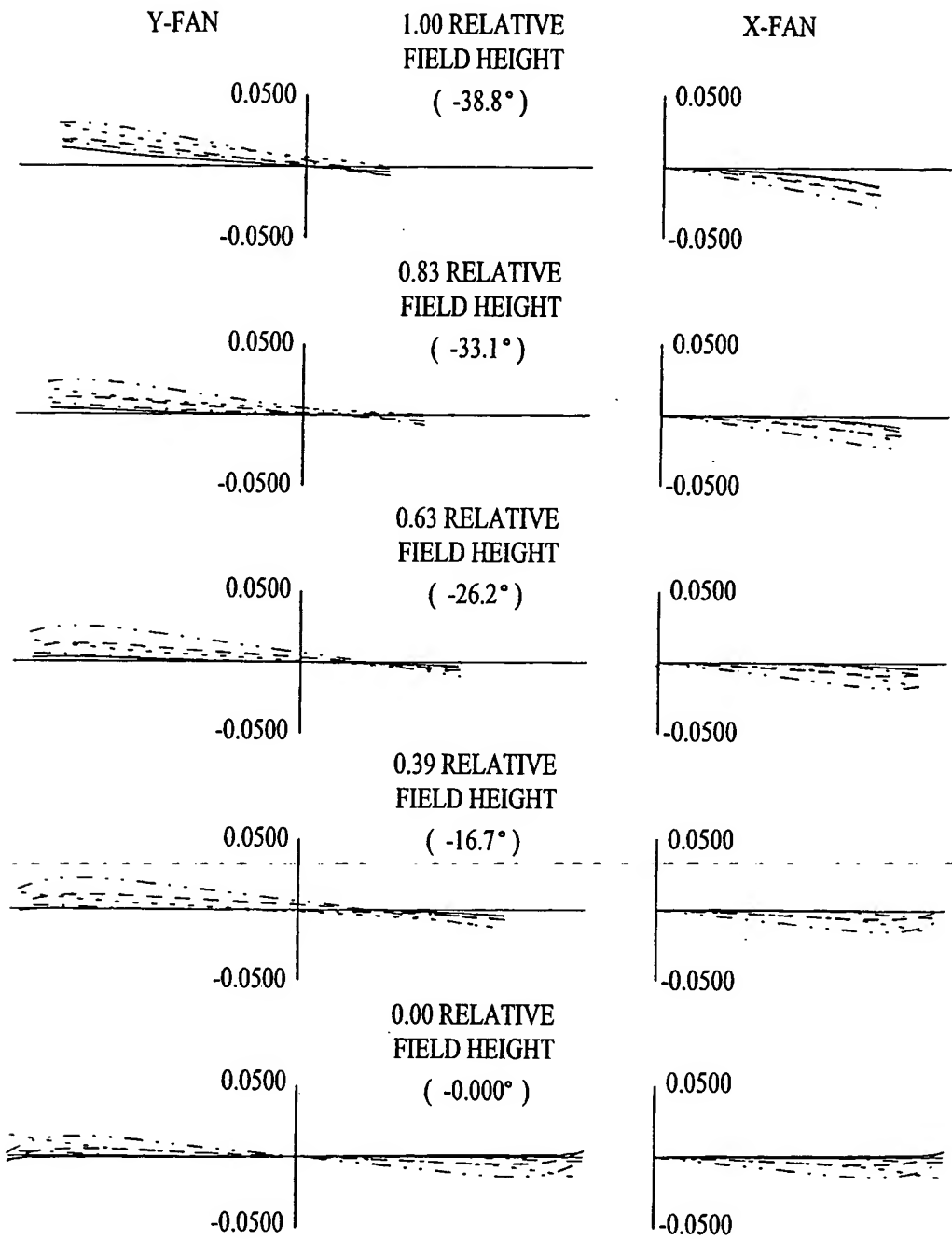
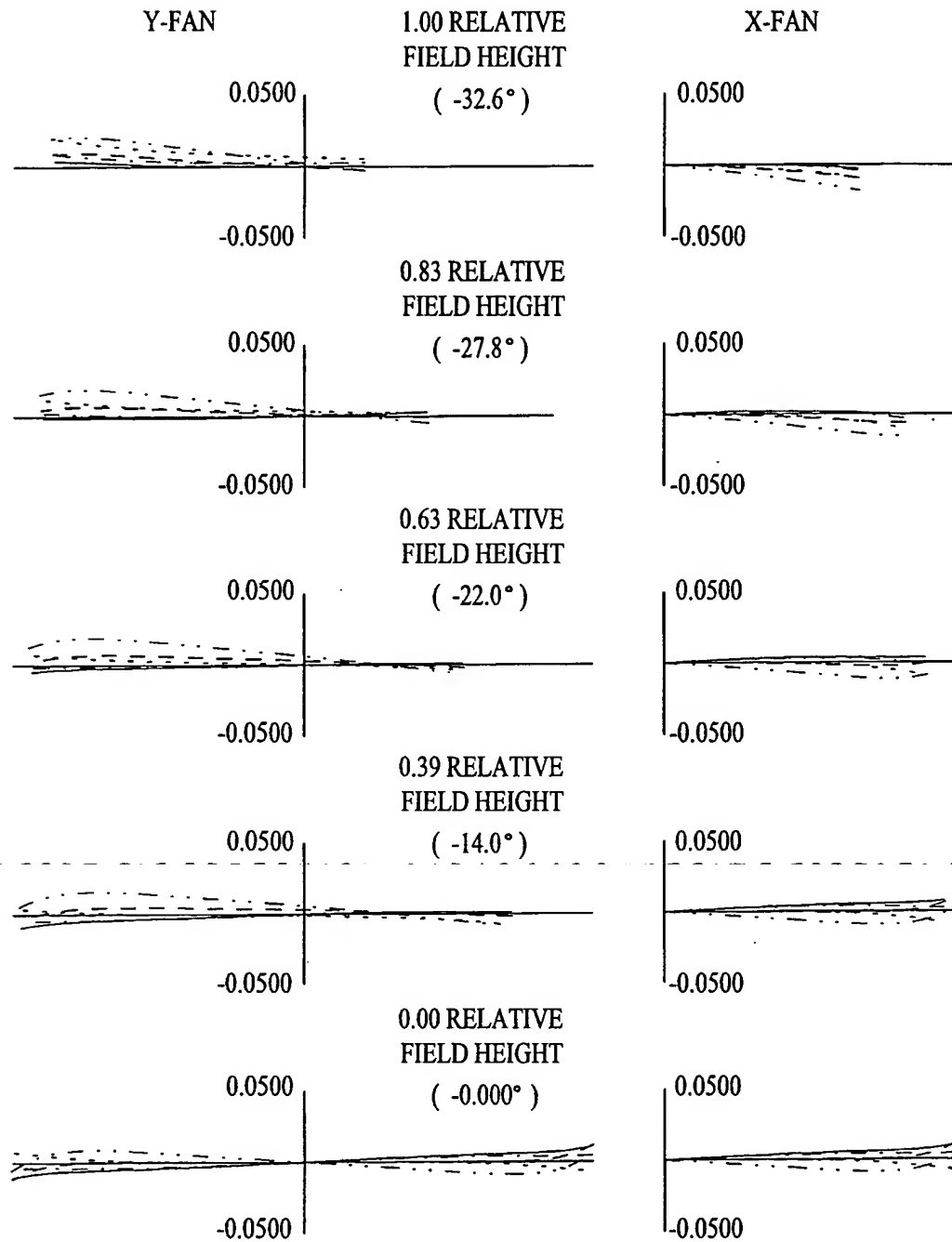


Fig. 38

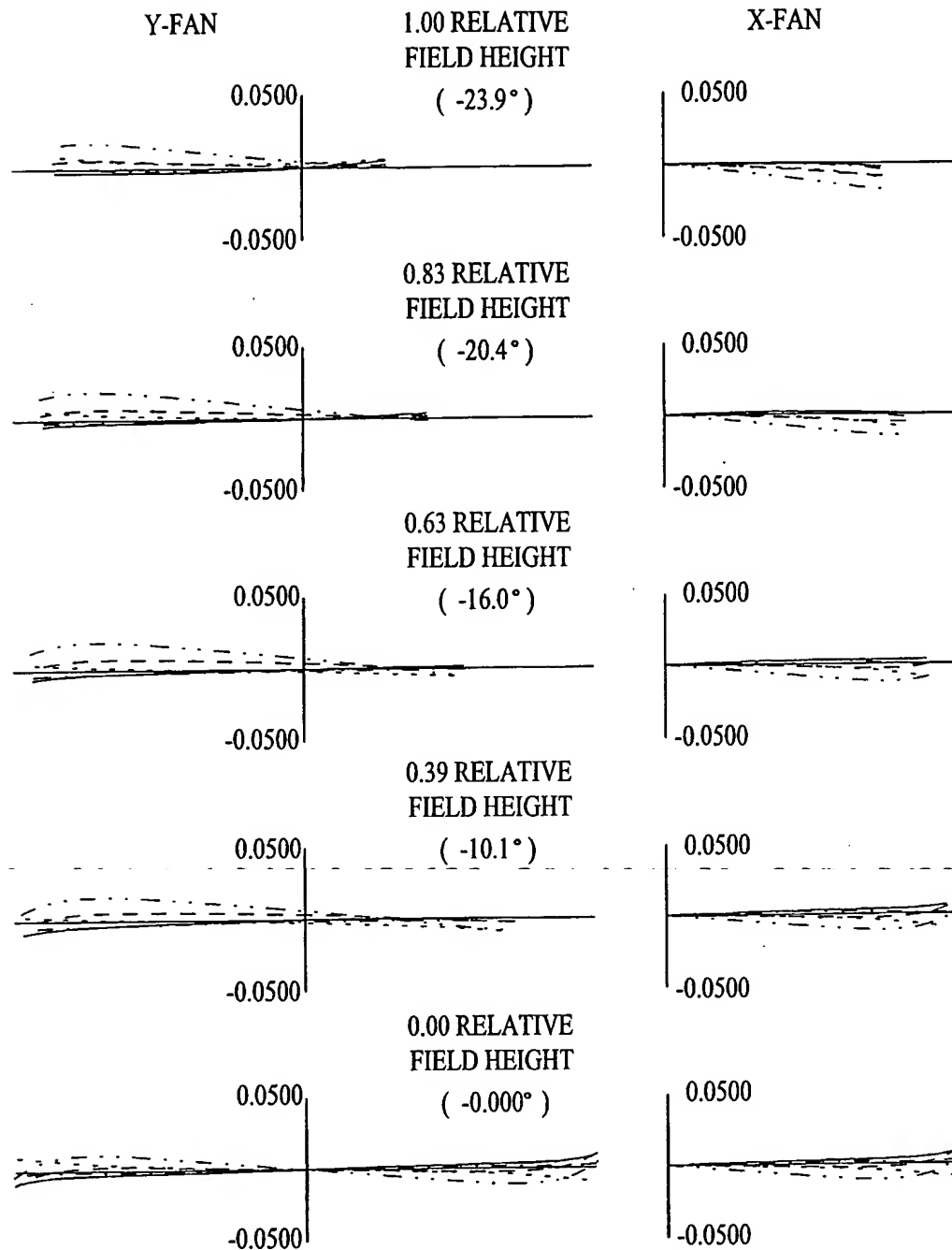


<i>Fig. 39</i> RAY ABERRATIONS ( MILLIMETERS )	----- 643.8469 NM
	----- 587.5600 NM
POSITION 1	----- 546.0700 NM
	----- 486.1300 NM
	----- 460.0000 NM

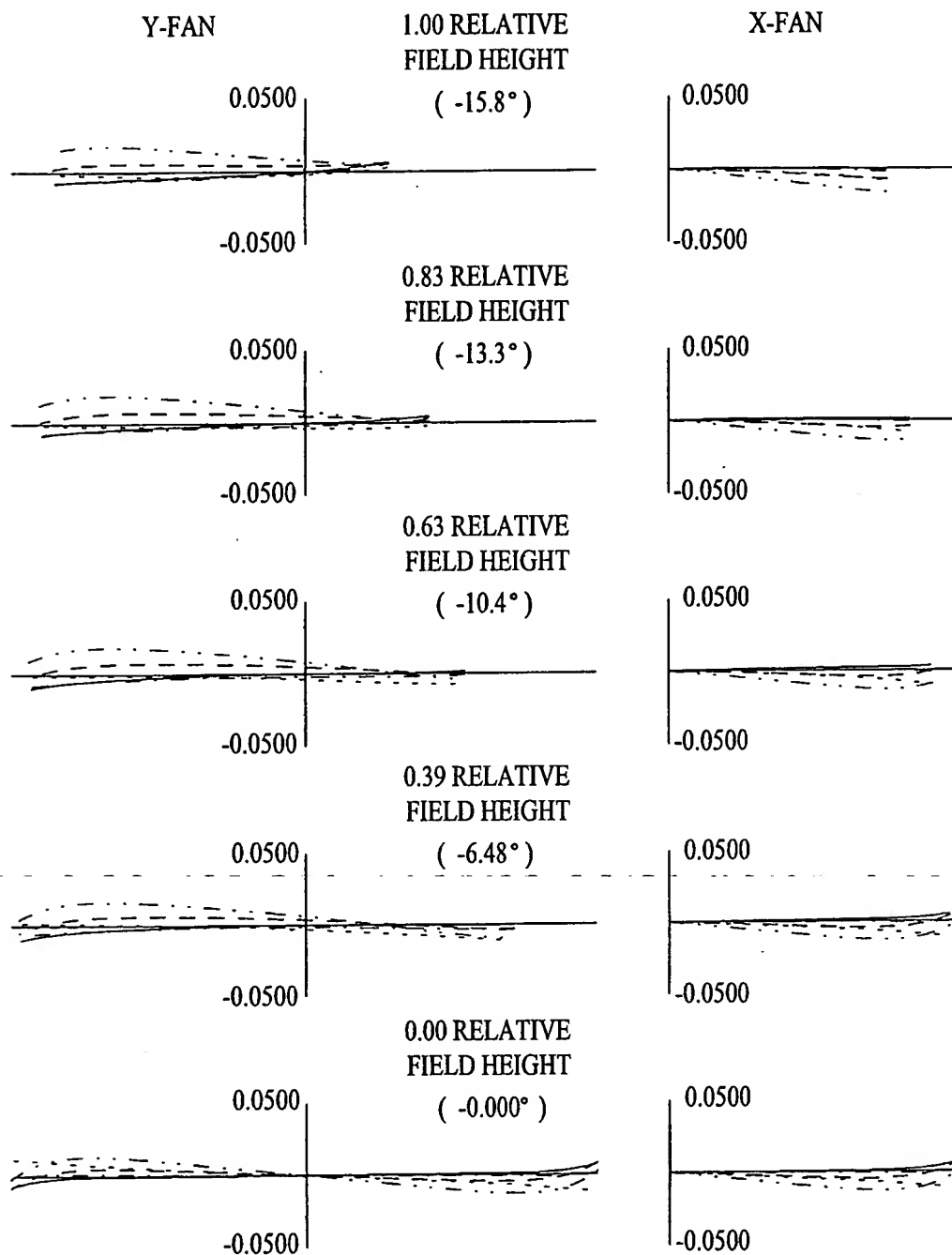


<p><i>Fig. 40</i></p> <p>RAY ABERRATIONS ( MILLIMETERS )</p>	<p>----- 643.8469 NM</p> <p>----- 587.5600 NM</p> <p>----- 546.0700 NM</p> <p>----- 486.1300 NM</p> <p>----- 460.0000 NM</p>
	<p>POSITION 2</p>

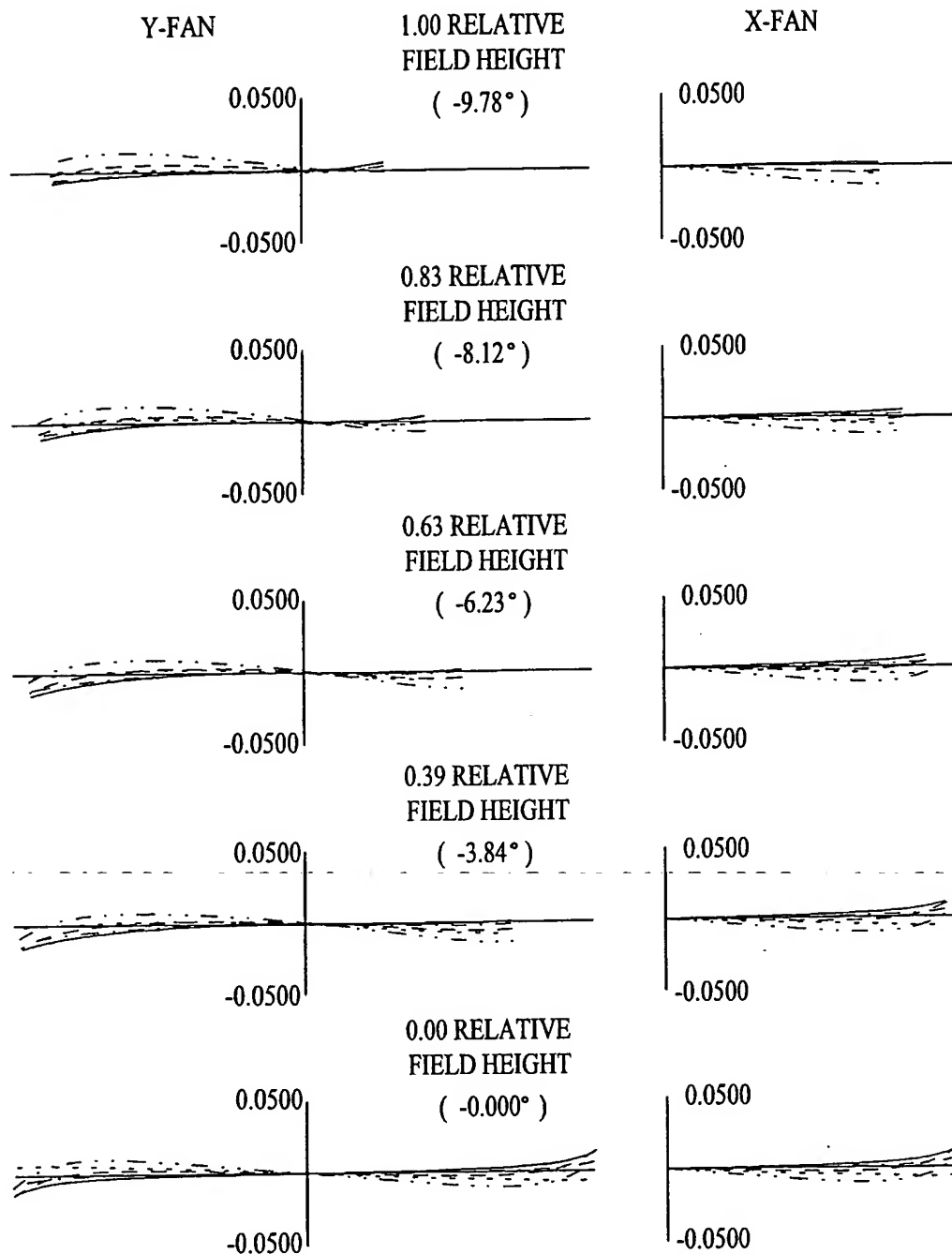




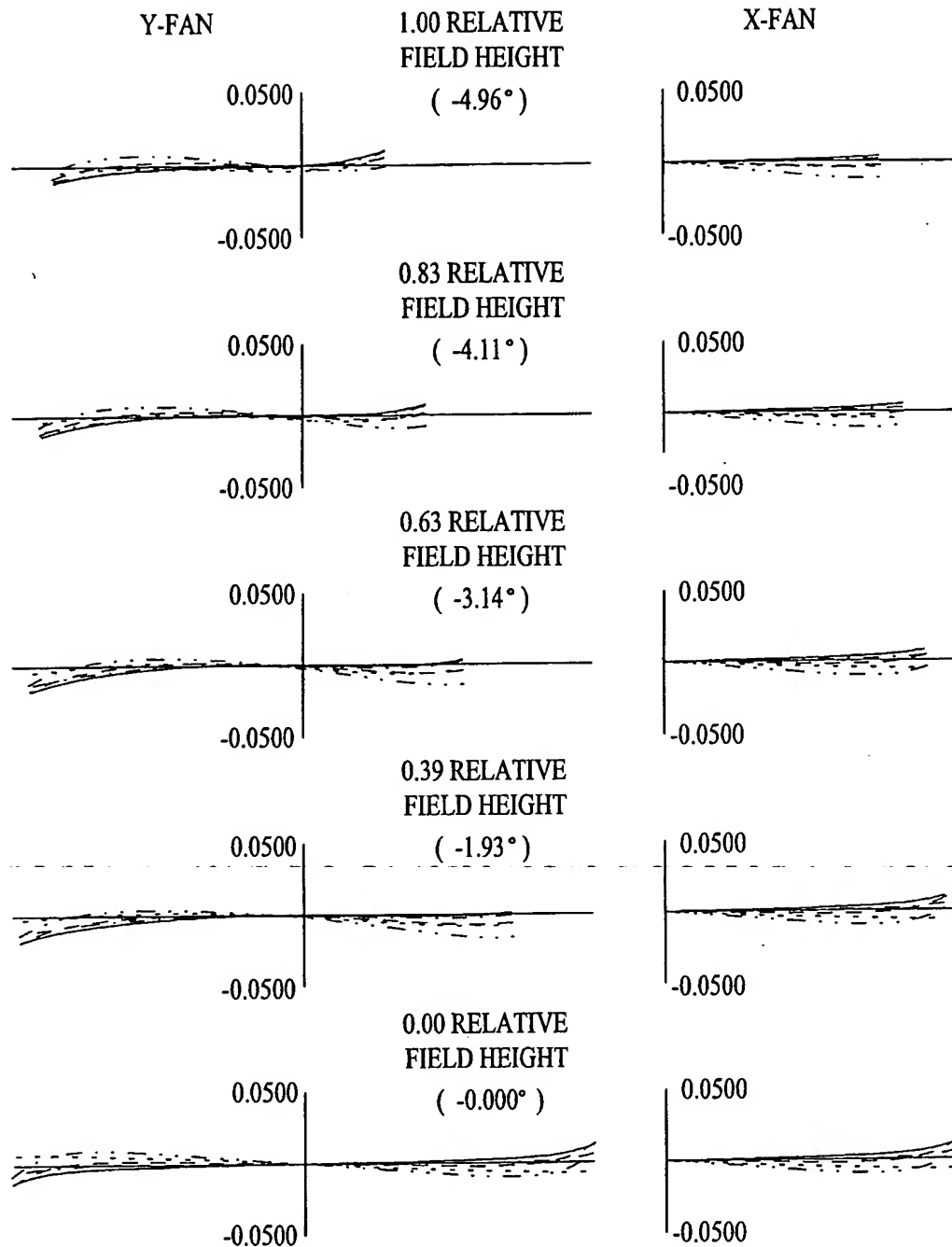
<p><i>Fig. 41</i></p> <p>RAY ABERRATIONS (MILLIMETERS)</p>	<p>----- 643.8469 NM</p> <p>- - - - - 587.5600 NM</p> <p>_____ 546.0700 NM</p> <p>- - - - - 486.1300 NM</p> <p>· · · · · 460.0000 NM</p>
	<p>POSITION 3</p>



<p><i>Fig. 42</i></p> <p>RAY ABERRATIONS (MILLIMETERS)</p>	<p>..... 643.8469 NM</p> <p>----- 587.5600 NM</p> <p>———— 546.0700 NM</p> <p>----- 486.1300 NM</p> <p>..... 460.0000 NM</p>
	<p>POSITION 4</p>



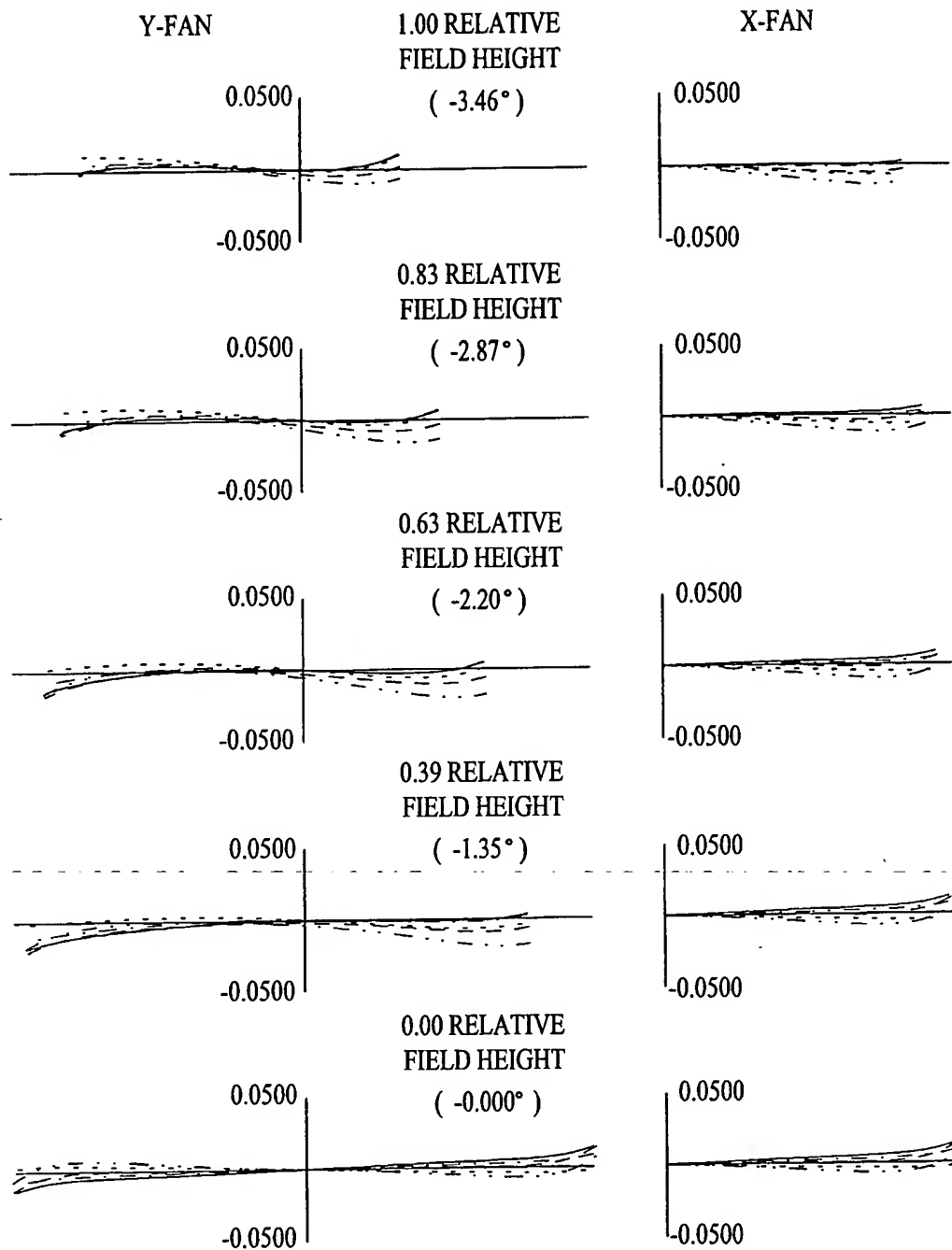
<p><i>Fig. 43</i></p> <p>RAY ABERRATIONS ( MILLIMETERS )</p>	<p>----- 643.8469 NM</p> <p>----- 587.5600 NM</p> <p>----- 546.0700 NM</p> <p>----- 486.1300 NM</p> <p>----- 460.0000 NM</p>
	<p>POSITION 5</p>



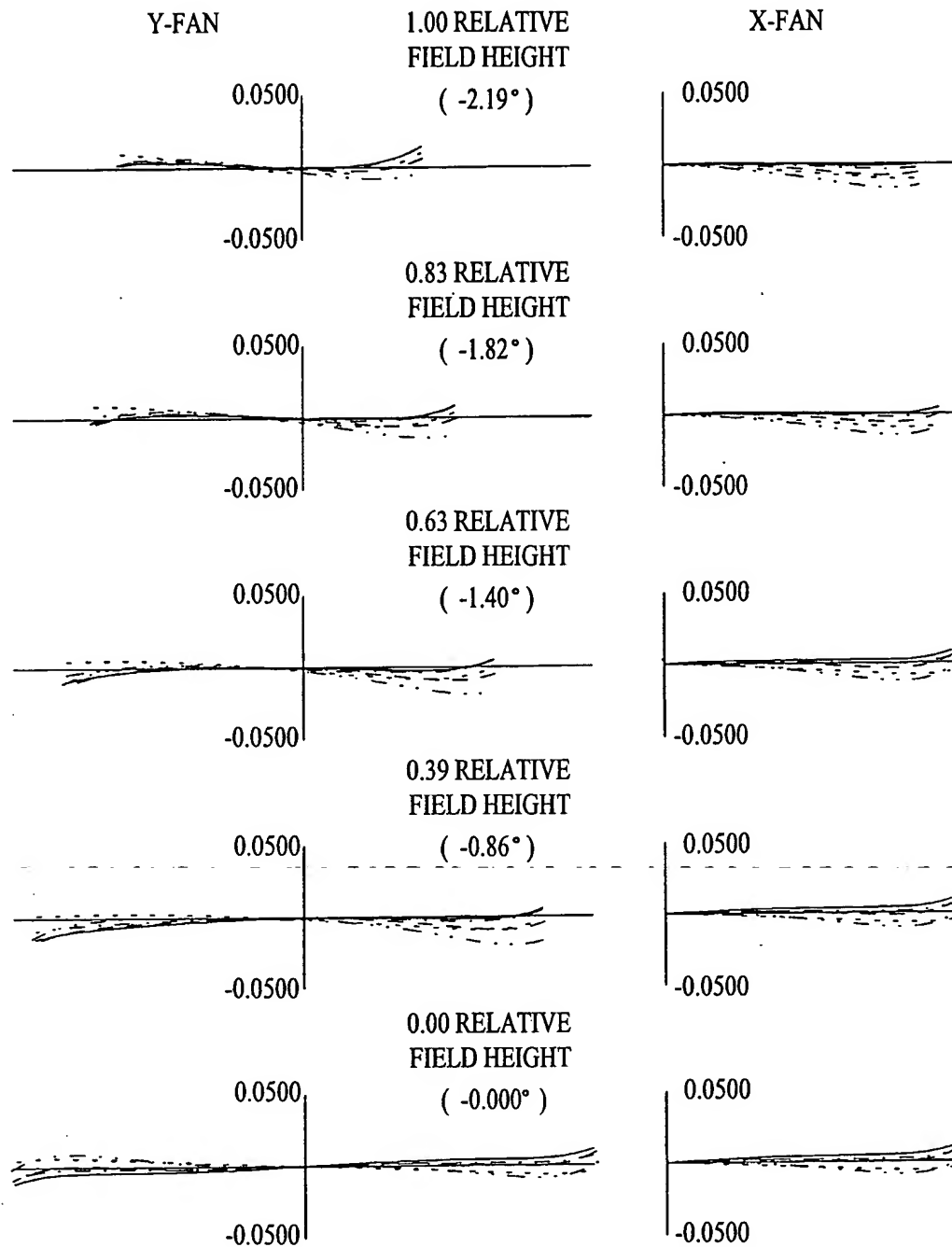
*Fig. 44*  
 RAY ABERRATIONS ( MILLIMETERS )

POSITION 6

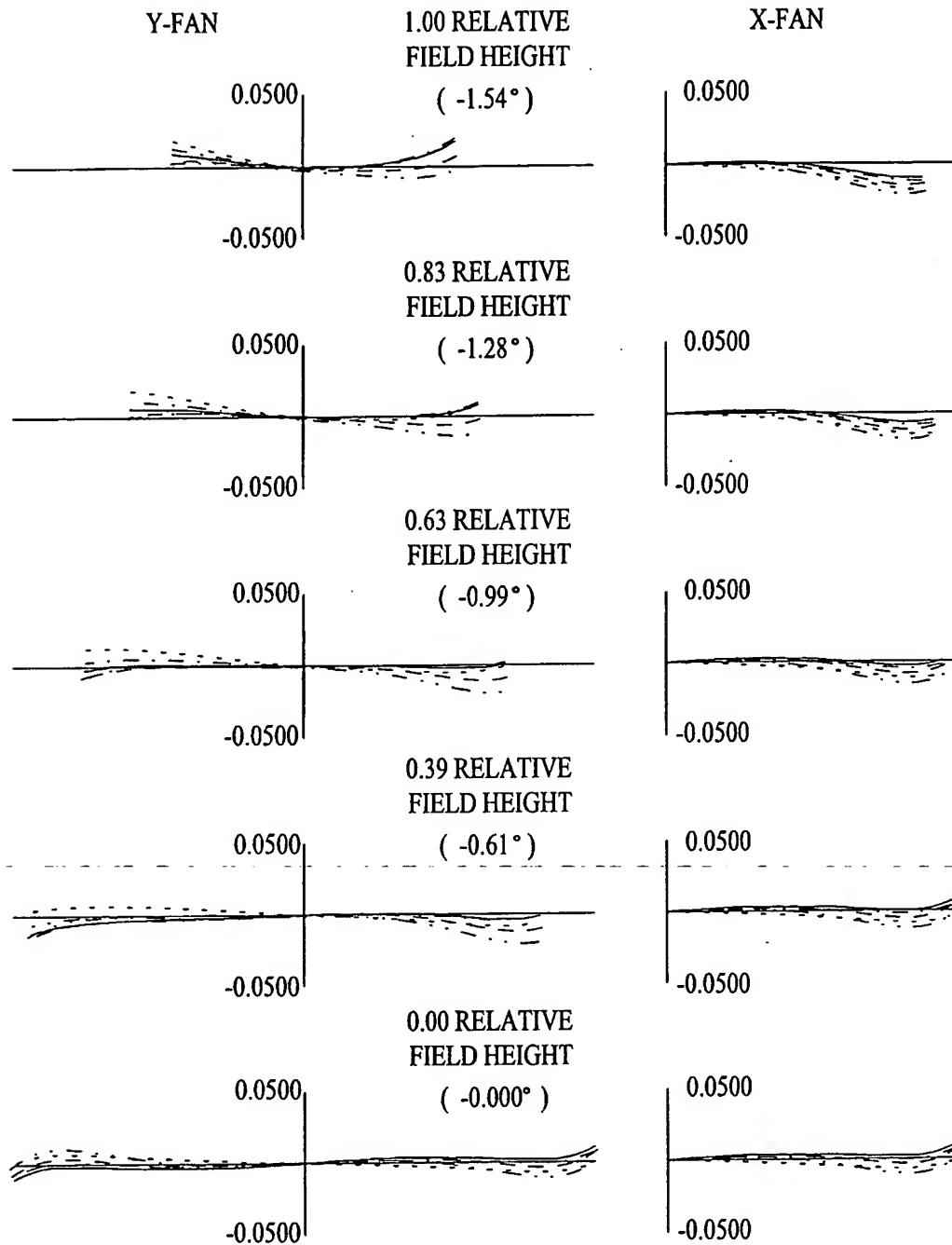
----- 643.8469 NM  
 - - - - - 587.5600 NM  
 \_\_\_\_\_ 546.0700 NM  
 - - - - - 486.1300 NM  
 . . . . . 460.0000 NM



<p><i>Fig. 45</i></p> <p>RAY ABERRATIONS (MILLIMETERS)</p>	<p>----- 643.8469 NM</p> <p>- - - - - 587.5600 NM</p> <p>_____ 546.0700 NM</p> <p>- - - - - 486.1300 NM</p> <p>.-.-.-.- 460.0000 NM</p>
	<p>POSITION 7</p>



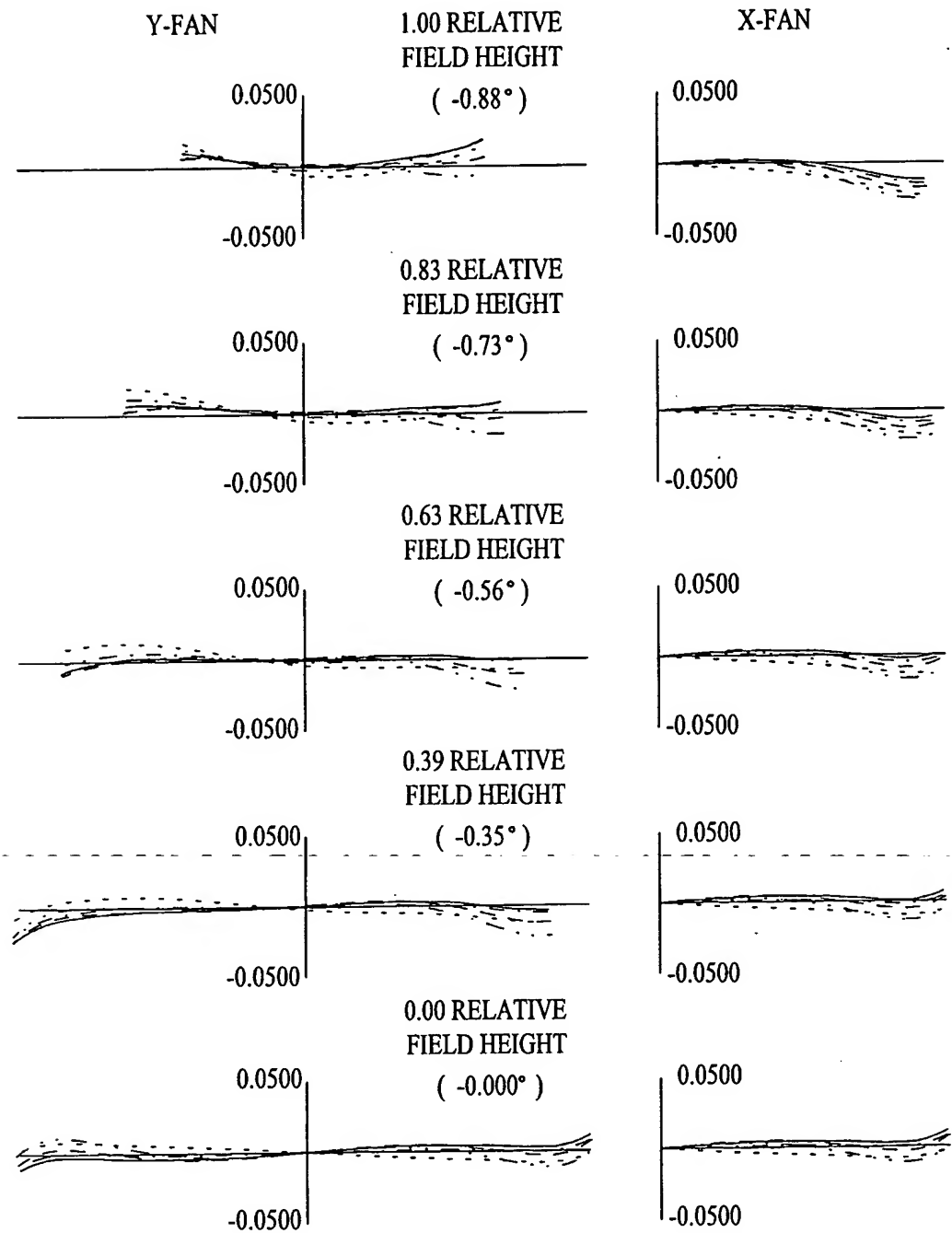
<p><i>Fig. 46</i></p> <p>RAY ABERRATIONS ( MILLIMETERS )</p>	<p>----- 643.8469 NM</p> <p>----- 587.5600 NM</p> <p>----- 546.0700 NM</p> <p>----- 486.1300 NM</p> <p>----- 460.0000 NM</p>
<p>POSITION 8</p>	



*Fig. 47*  
 RAY ABERRATIONS (MILLIMETERS)

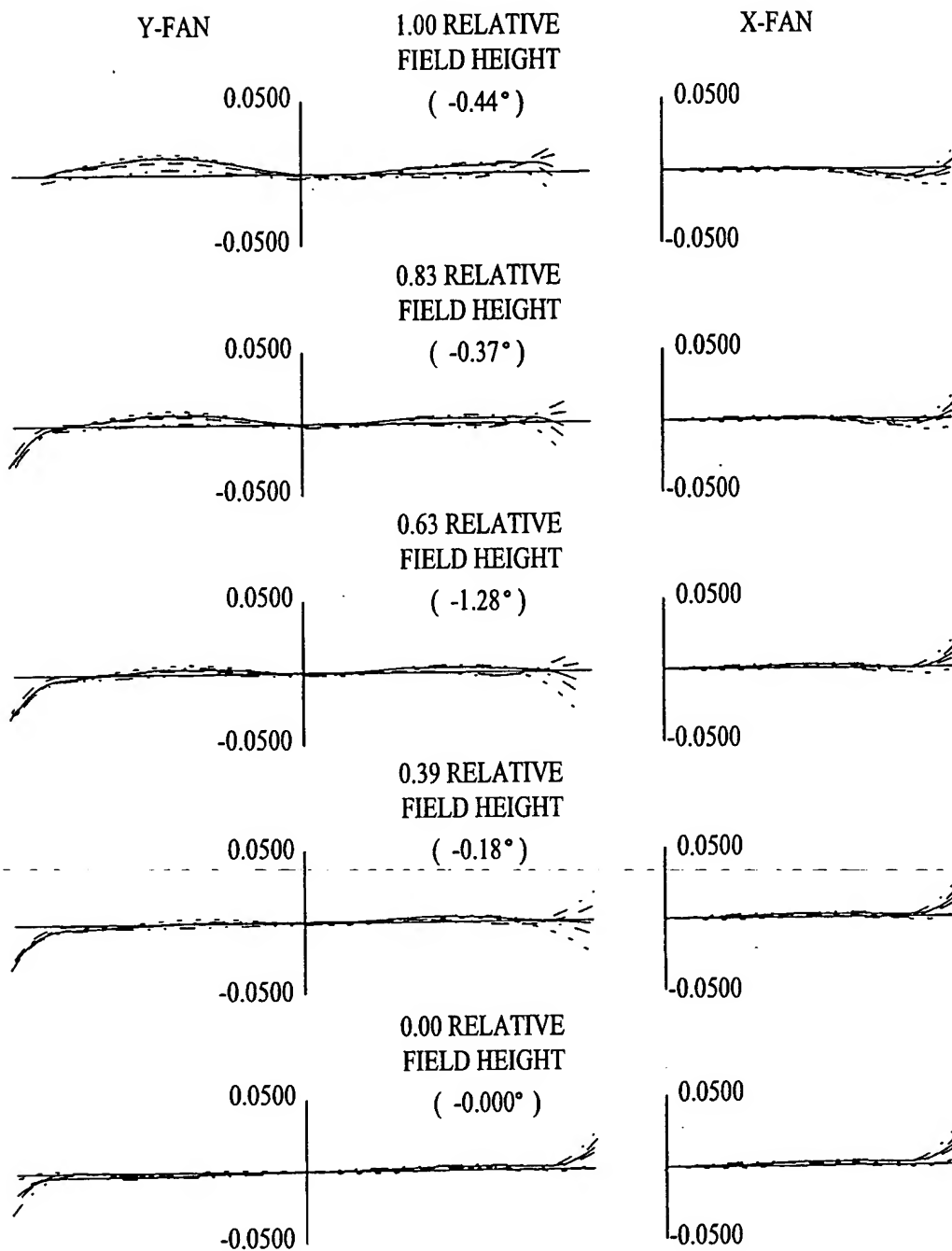
POSITION 9

----- 643.8469 NM  
 ---- 587.5600 NM  
 \_\_\_\_\_ 546.0700 NM  
 -.-.-.- 486.1300 NM  
 - - - - - 460.0000 NM

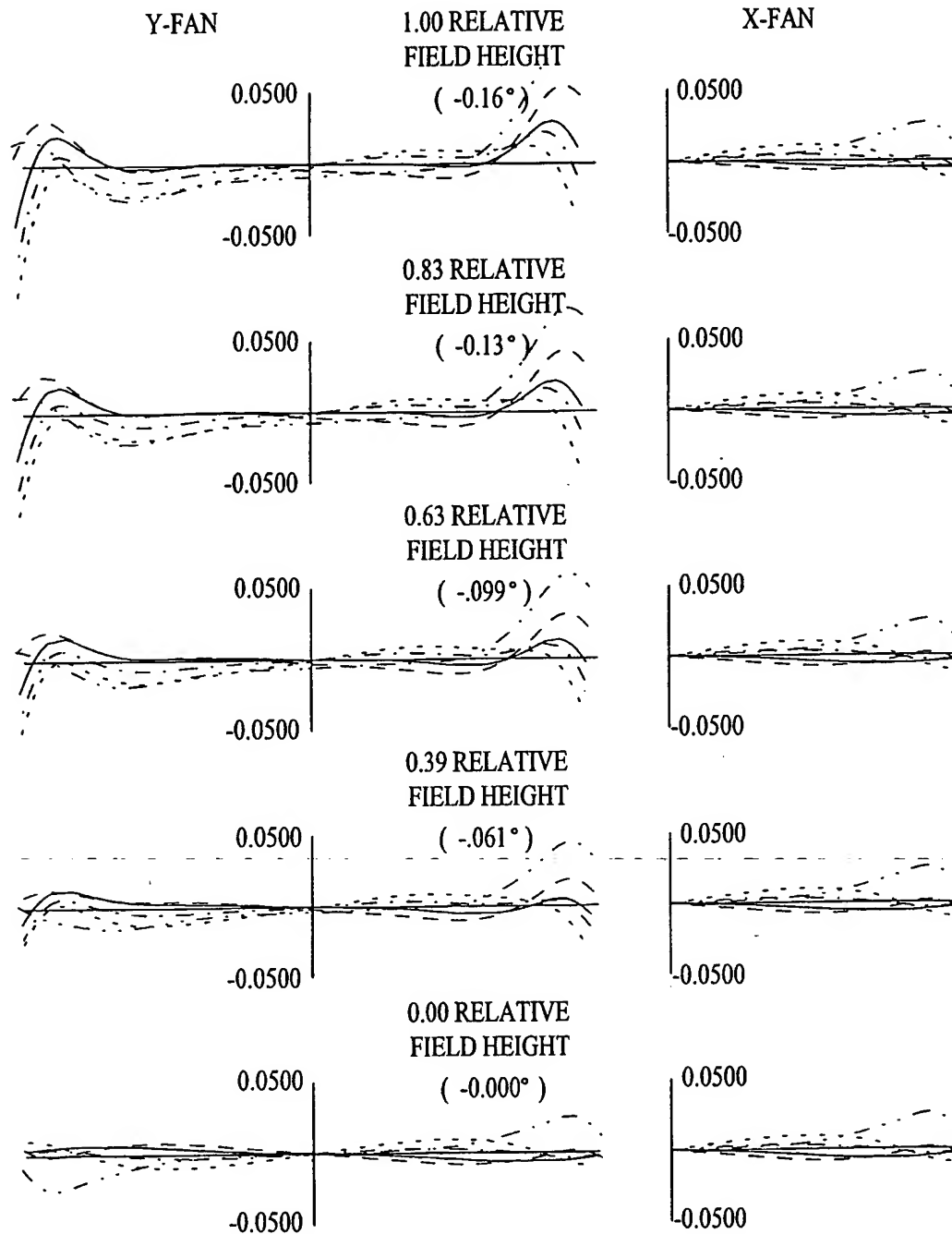


<i>Fig. 48</i> RAY ABERRATIONS ( MILLIMETERS ) POSITION 10	----- 643.8469 NM
	----- 587.5600 NM
	----- 546.0700 NM
	----- 486.1300 NM
	----- 460.0000 NM

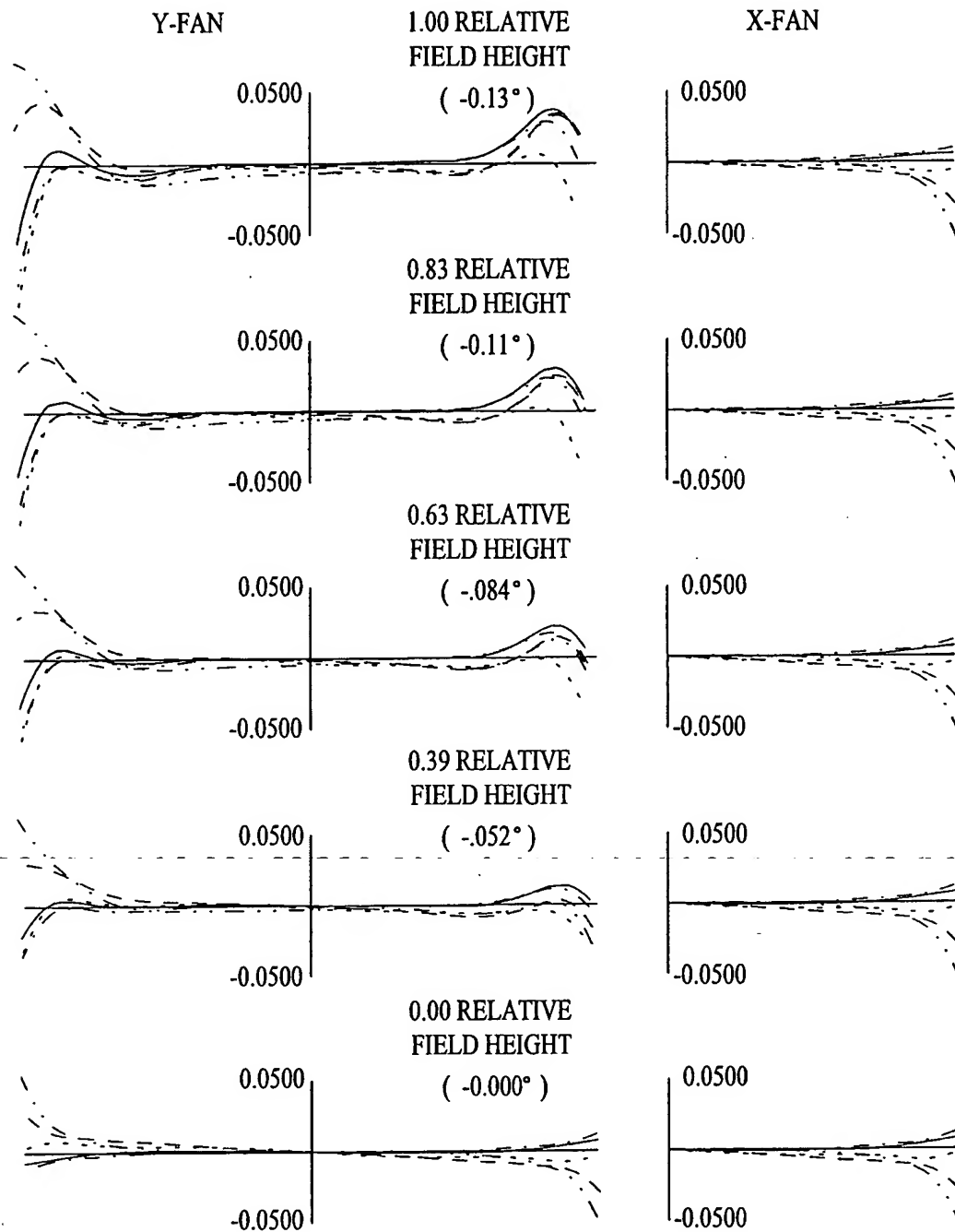




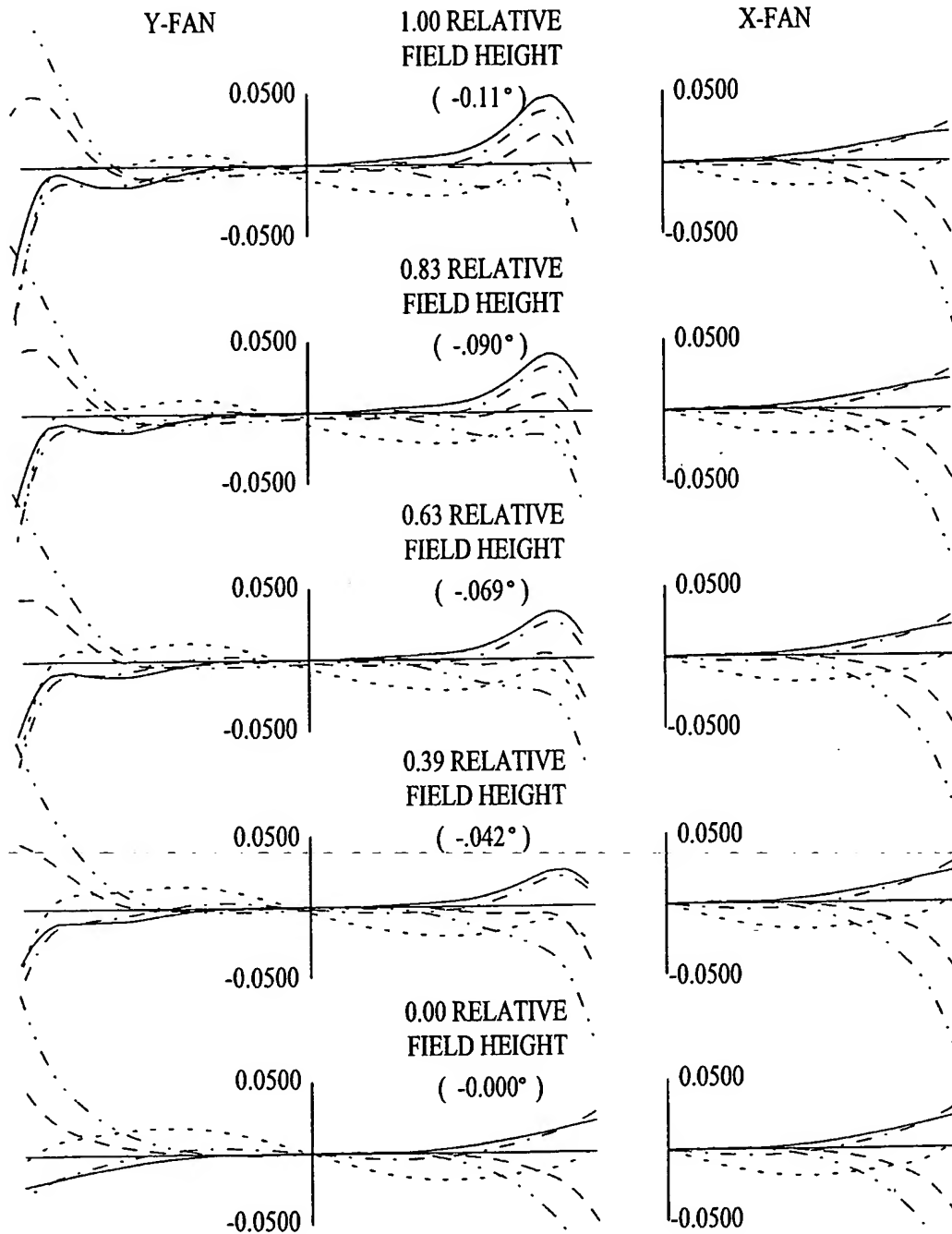
<p><i>Fig. 49</i></p> <p>RAY ABERRATIONS ( MILLIMETERS )</p>	<p>----- 643.8469 NM</p> <p>----- 587.5600 NM</p> <p>----- 546.0700 NM</p> <p>----- 486.1300 NM</p> <p>----- 460.0000 NM</p>
	<p>POSITION 11</p>



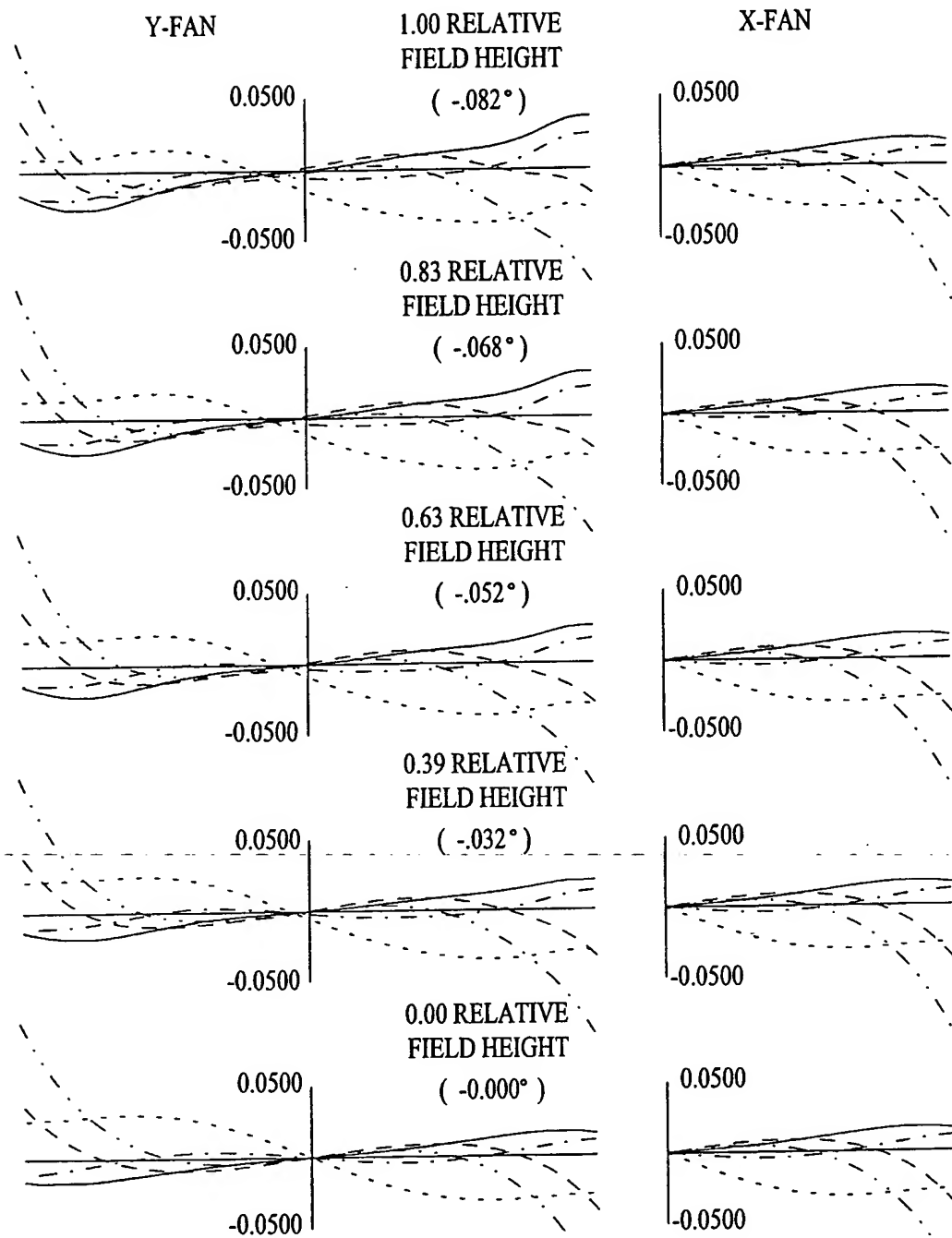
<p><i>Fig. 50</i></p> <p>RAY ABERRATIONS (MILLIMETERS)</p>	<p>----- 643.8469 NM</p> <p>----- 587.5600 NM</p> <p>----- 546.0700 NM</p> <p>----- 486.1300 NM</p> <p>----- 460.0000 NM</p>
	<p>POSITION 12</p>



<p><b>Fig. 51</b></p> <p>RAY ABERRATIONS (MILLIMETERS)</p>	<p>----- 643.8469 NM</p> <p>----- 587.5600 NM</p> <p>----- 546.0700 NM</p> <p>----- 486.1300 NM</p> <p>----- 460.0000 NM</p>
<p>POSITION 13</p>	

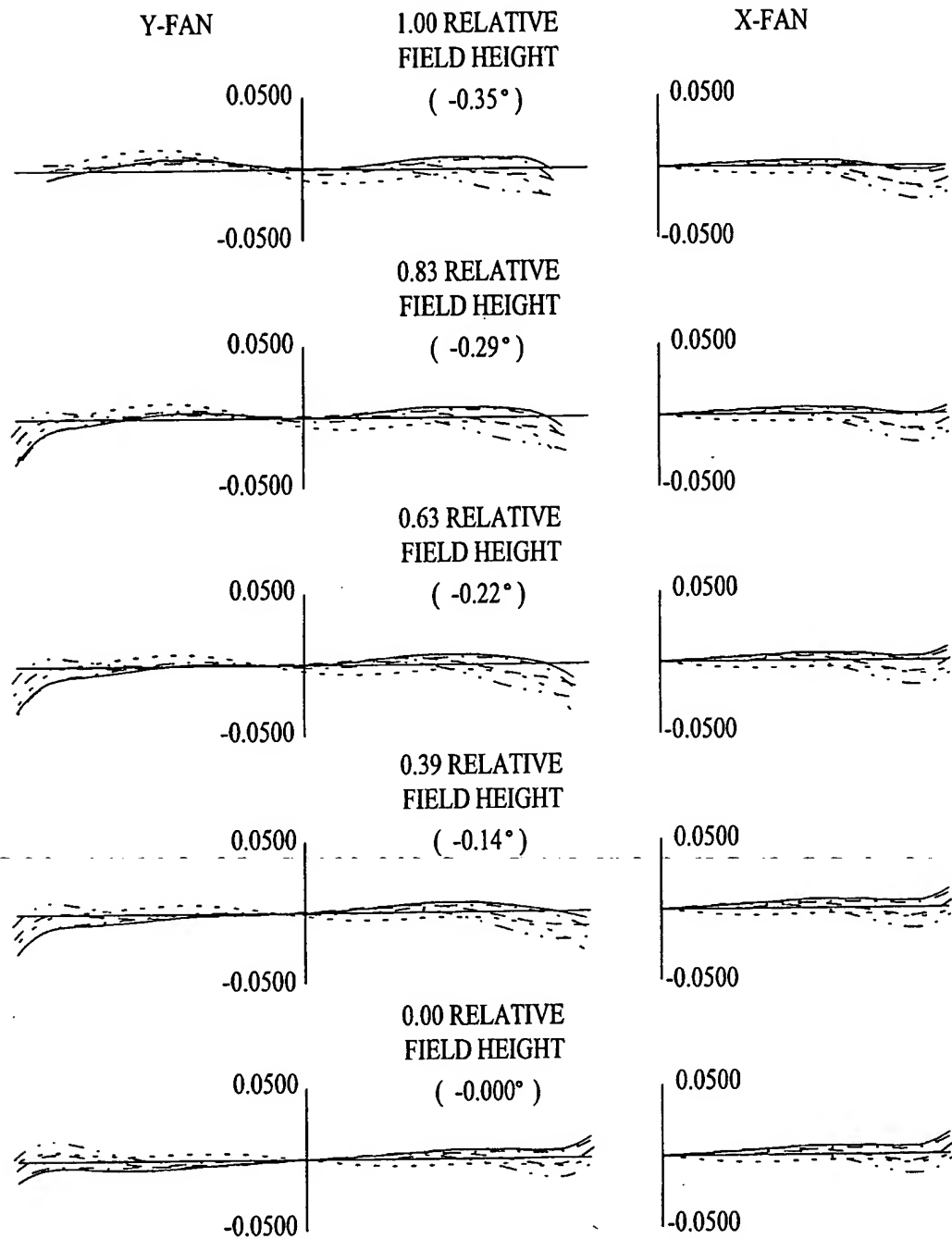


<p><b>Fig. 52</b></p> <p>RAY ABERRATIONS (MILLIMETERS)</p> <p>POSITION 14</p>	<p>--- 643.8469 NM</p> <p>- - - 587.5600 NM</p> <p>— 546.0700 NM</p> <p>- - - 486.1300 NM</p> <p>· · · 460.0000 NM</p>
-------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------

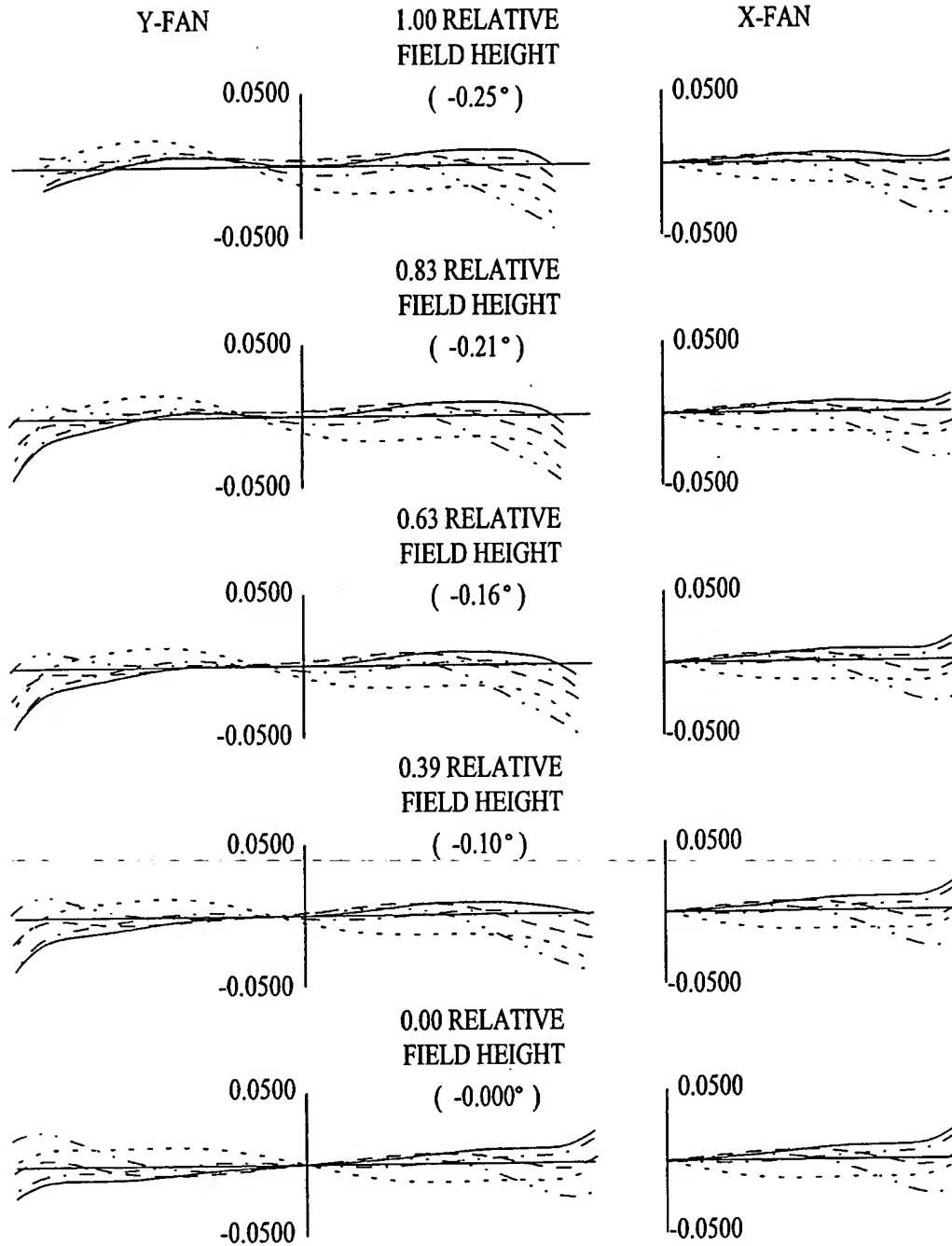


**Fig. 53**  
 RAY ABERRATIONS (MILLIMETERS)  
 POSITION 15

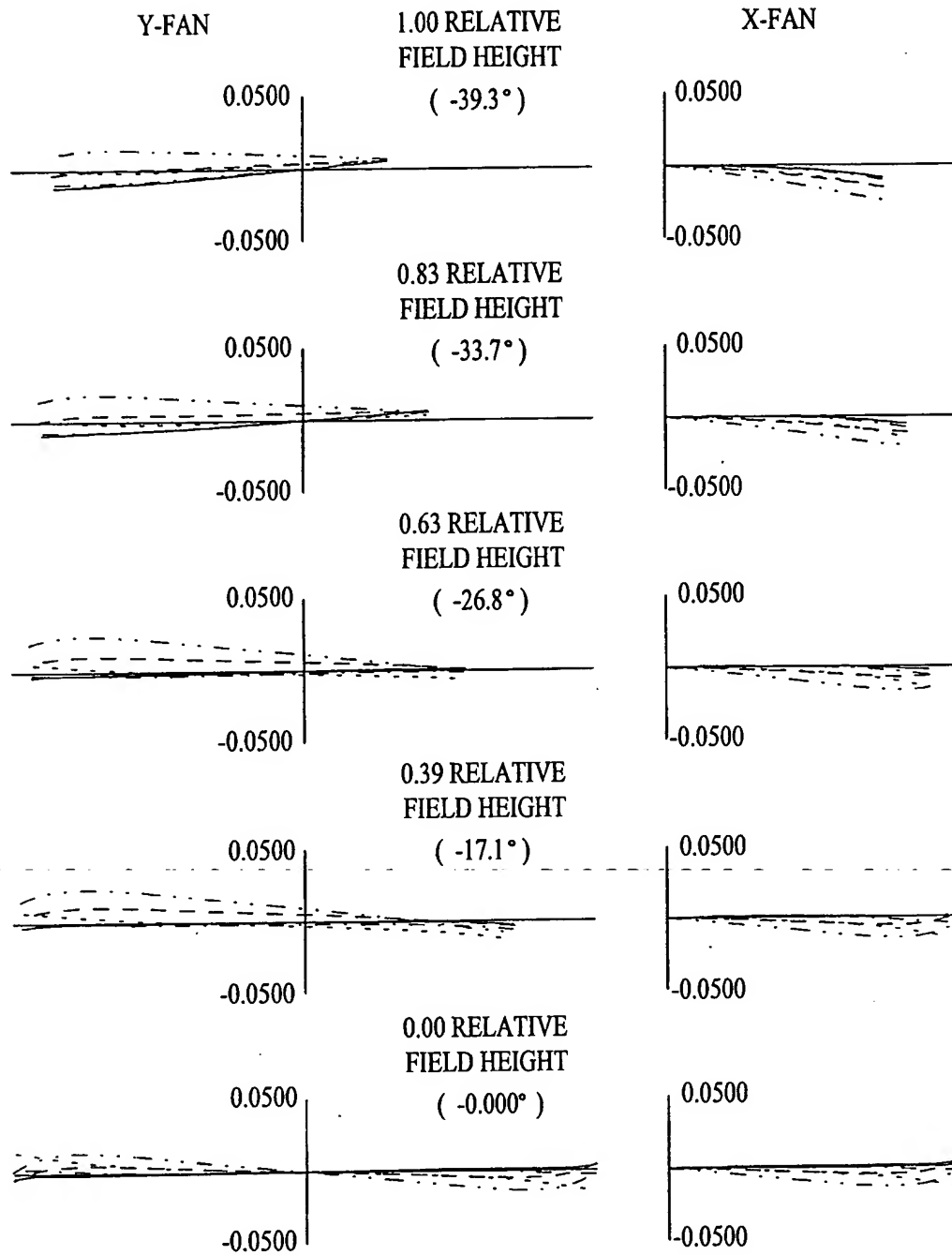
----- 643.8469 NM  
 - - - - - 587.5600 NM  
 \_\_\_\_\_ 546.0700 NM  
 - - - - - 486.1300 NM  
 . - . - . 460.0000 NM



<i>Fig. 54</i> RAY ABERRATIONS ( MILLIMETERS )	----- 643.8469 NM
	----- 587.5600 NM
POSITION 16	----- 546.0700 NM
	----- 486.1300 NM
	----- 460.0000 NM

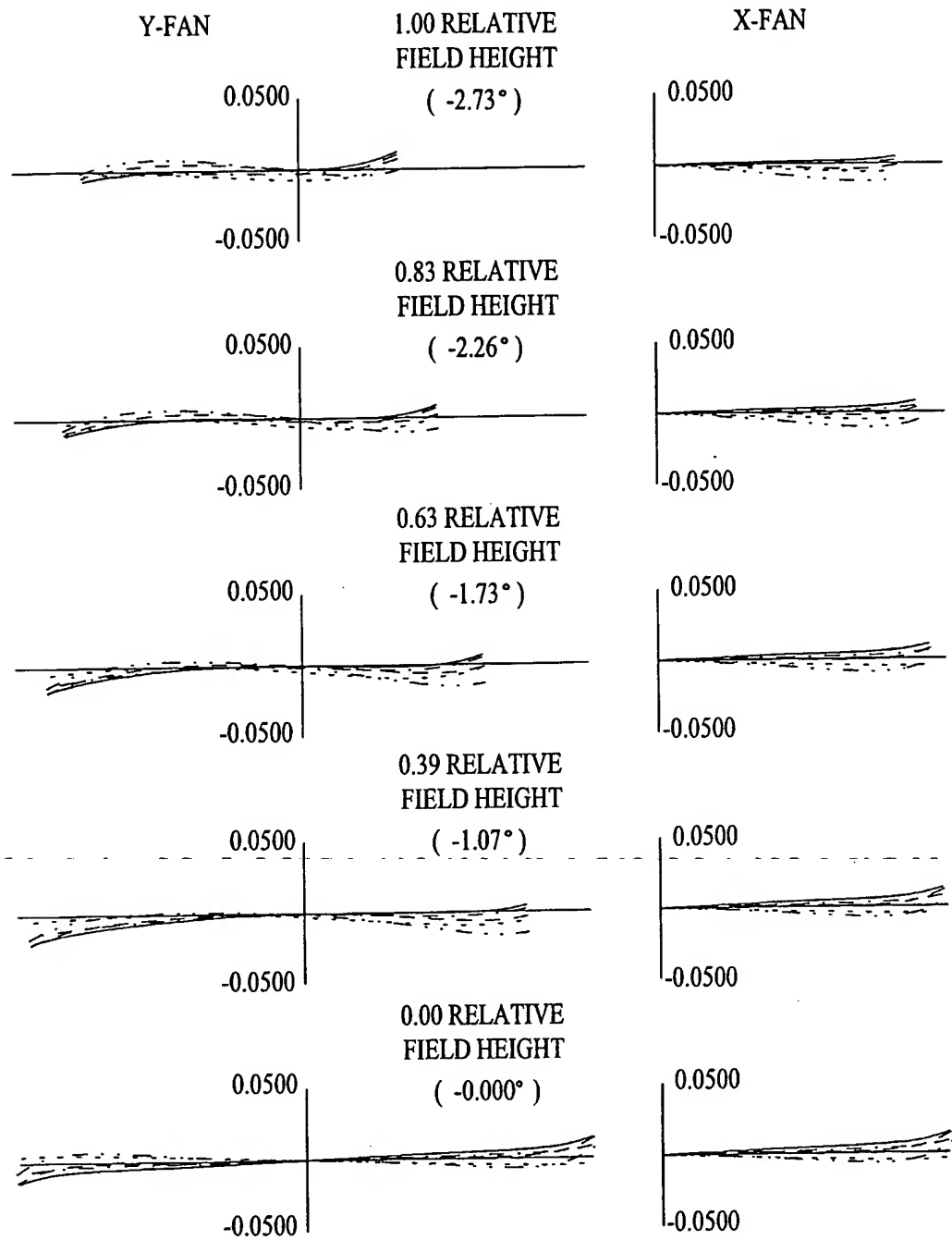


<p><i>Fig. 55</i></p> <p>RAY ABERRATIONS (MILLIMETERS)</p>	<p>----- 643.8469 NM</p> <p>----- 587.5600 NM</p> <p>----- 546.0700 NM</p> <p>----- 486.1300 NM</p> <p>----- 460.0000 NM</p>
	<p>POSITION 17</p>

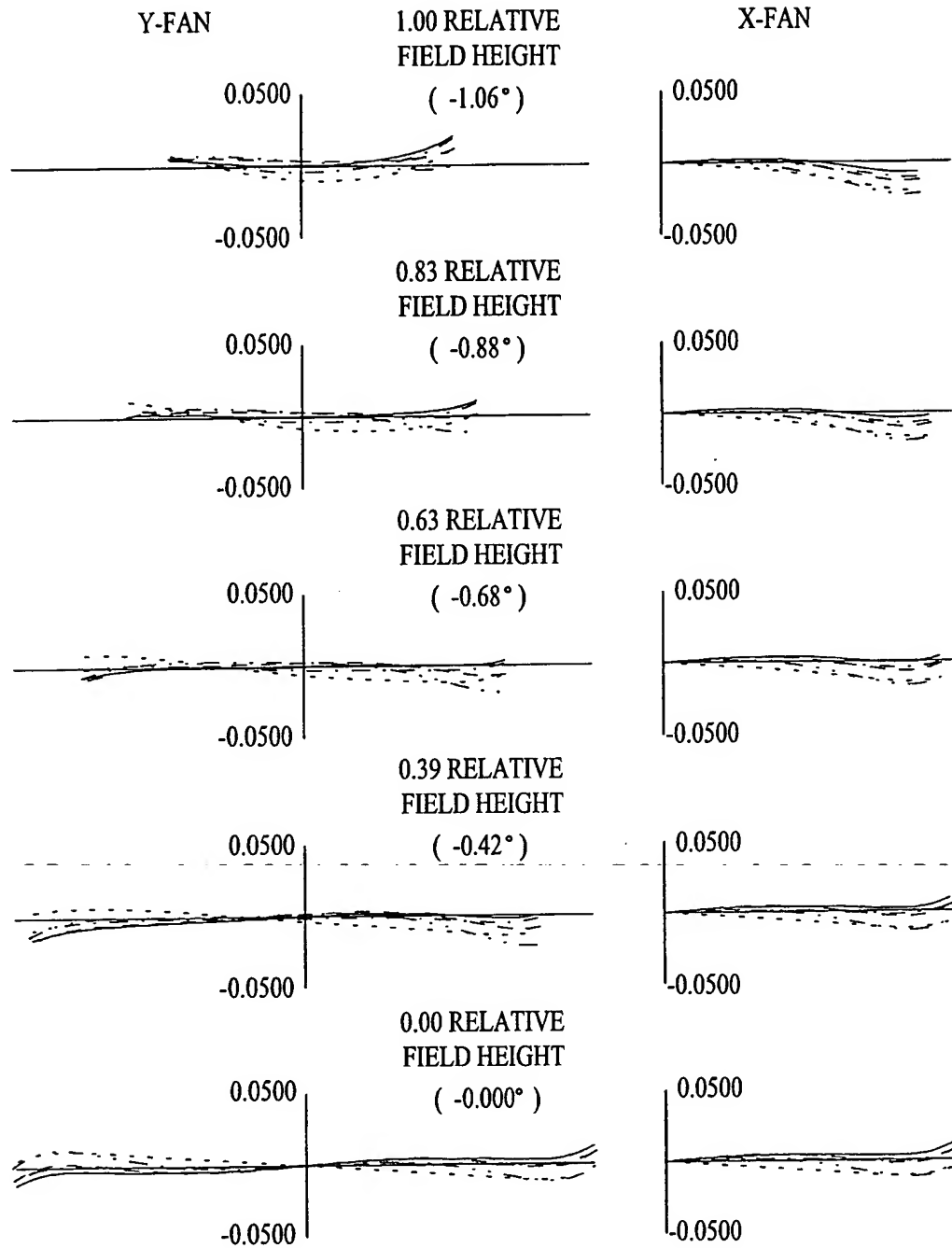


<p><i>Fig. 50</i></p> <p>RAY ABERRATIONS ( MILLIMETERS )</p>	<p>----- 643.8469 NM</p> <p>----- 587.5600 NM</p> <p>----- 546.0700 NM</p> <p>----- 486.1300 NM</p> <p>----- 460.0000 NM</p>
	<p>POSITION 18</p>



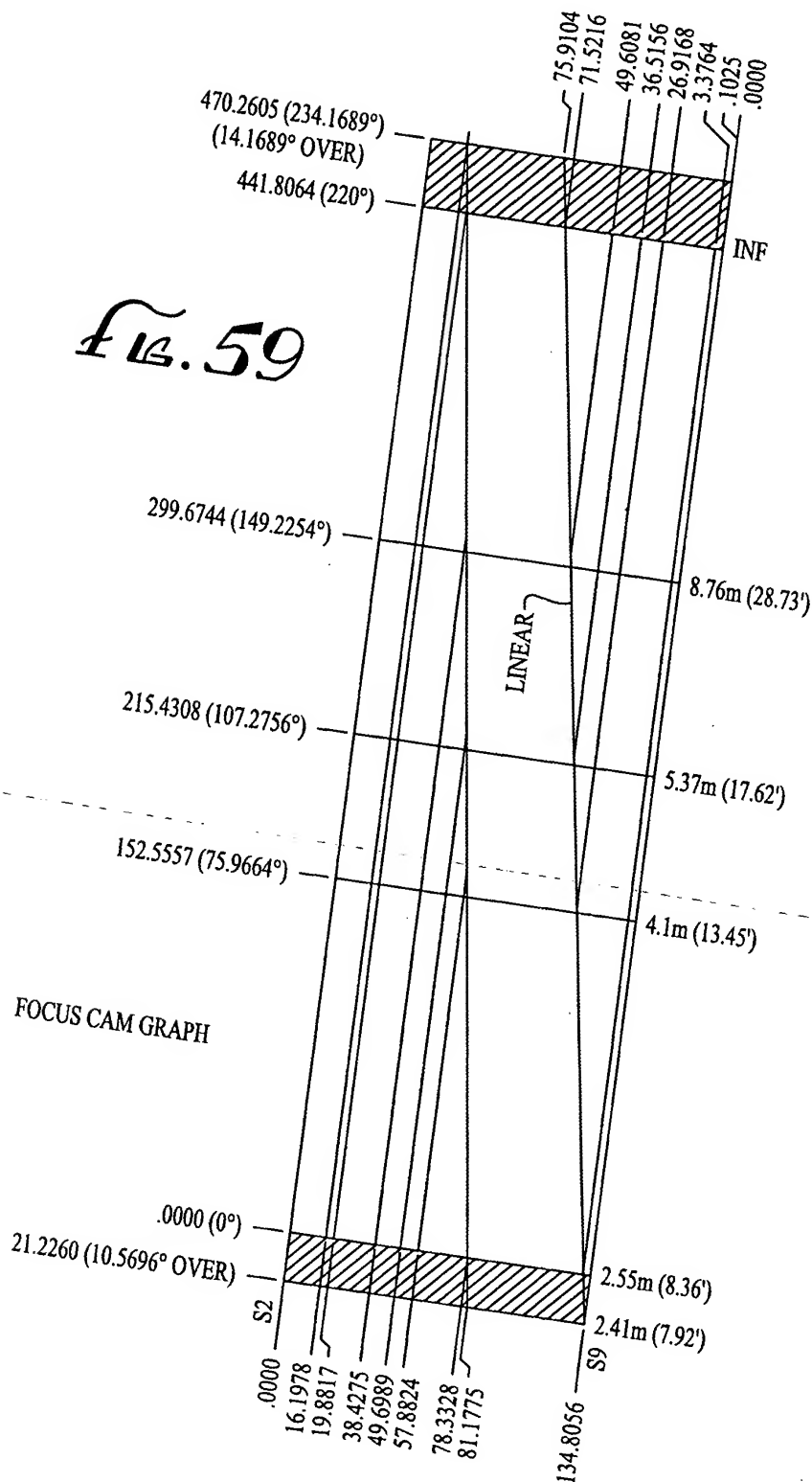


<b>Fig. 57</b> RAY ABERRATIONS ( MILLIMETERS ) POSITION 19	----- 643.8469 NM
	----- 587.5600 NM
	----- 546.0700 NM
	----- 486.1300 NM
	----- 460.0000 NM



<p><i>Fig. 58</i></p> <p>RAY ABERRATIONS ( MILLIMETERS )</p>	<p>----- 643.8469 NM</p> <p>- - - - - 587.5600 NM</p> <p>————— 546.0700 NM</p> <p>- - - - - 486.1300 NM</p> <p>- . - . - 460.0000 NM</p>
<p>POSITION 20</p>	

Fig. 59



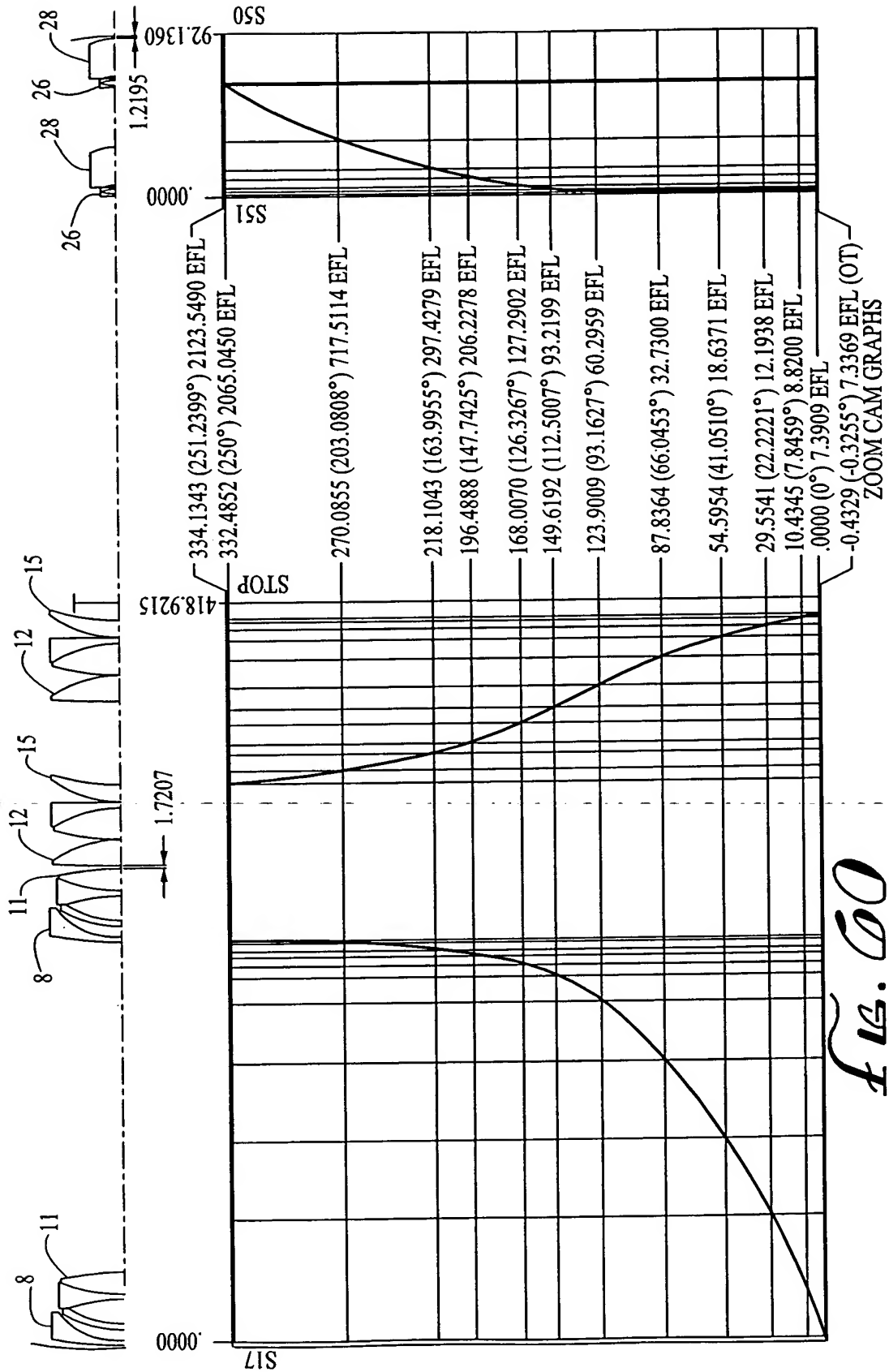


Fig. 60

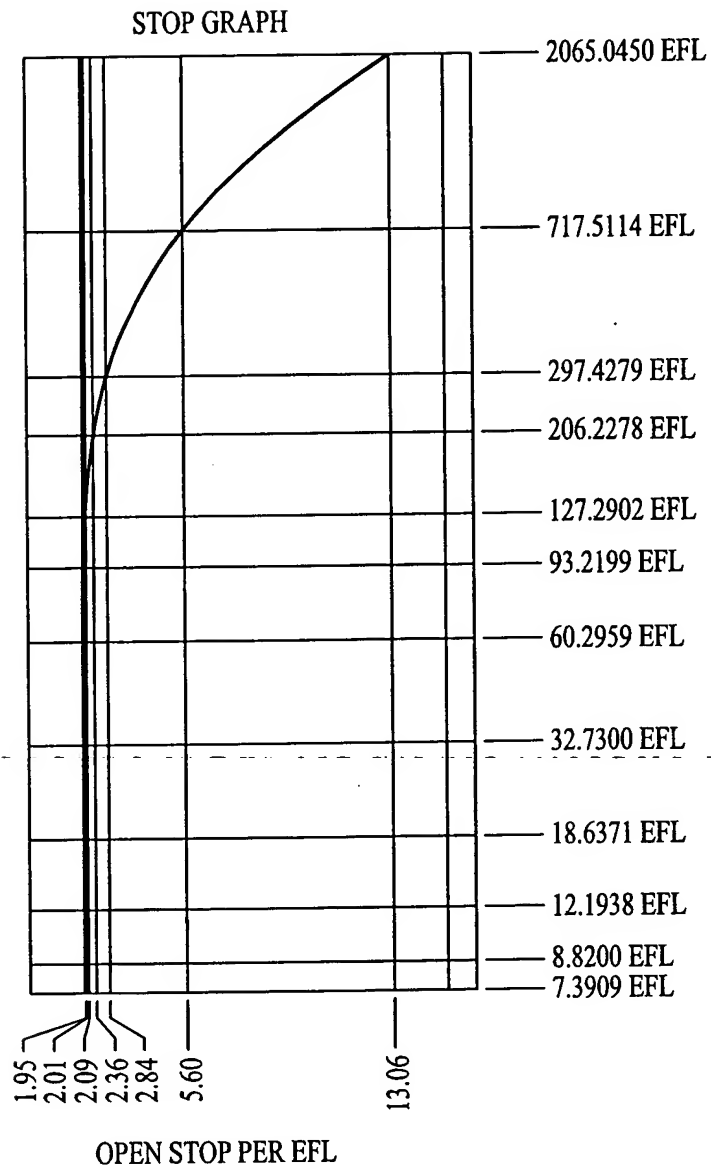
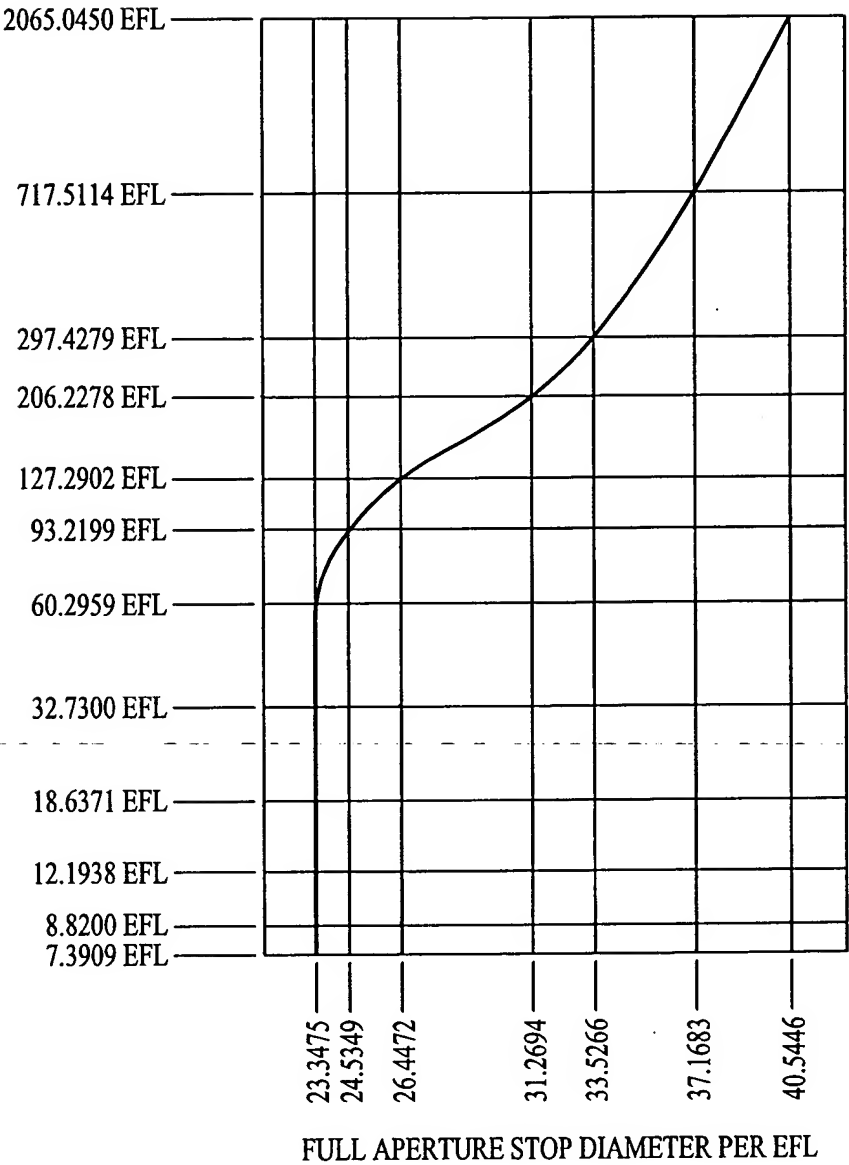
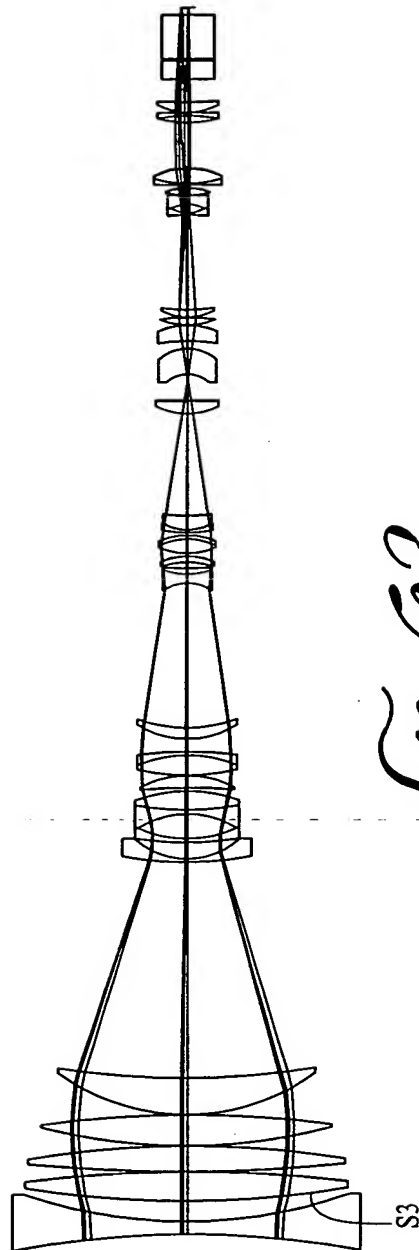


FIG. 01



*Fig. 62*



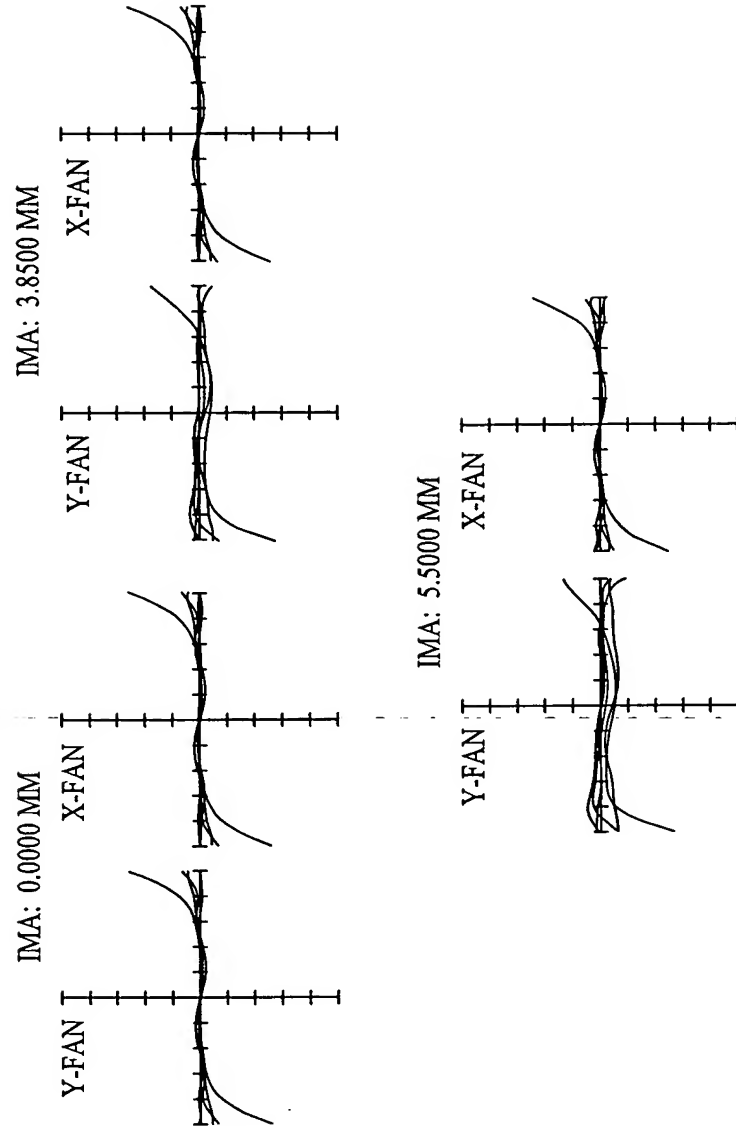


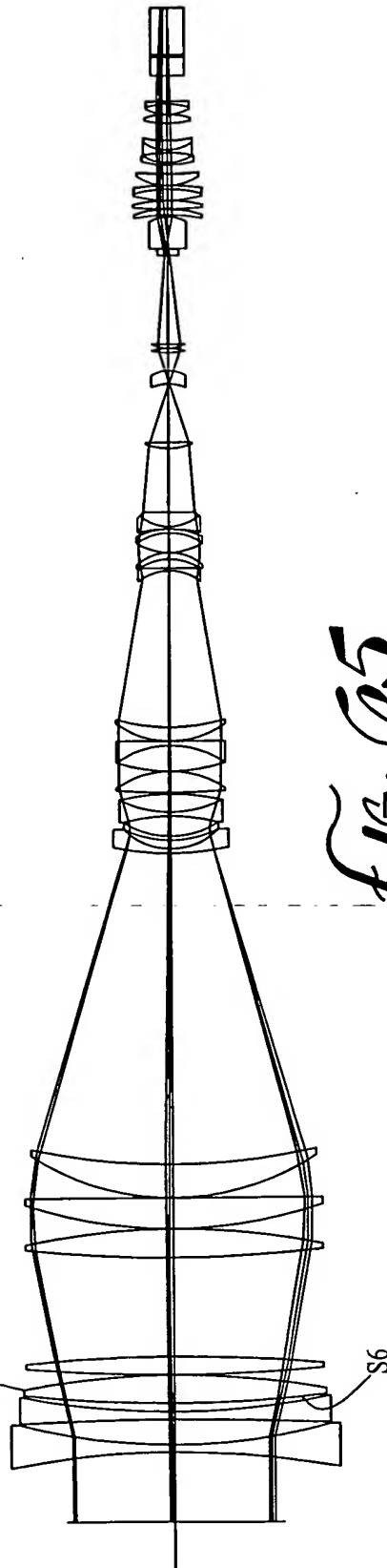
Fig. 04

WAVE LENGTHS RANGE 455-656 NM  
MAXIMUM VERTICAL SCALE +/- 100 MICRONS



FOCUS DISTANCE = INFINITY

THIRD LENS ELEMENT



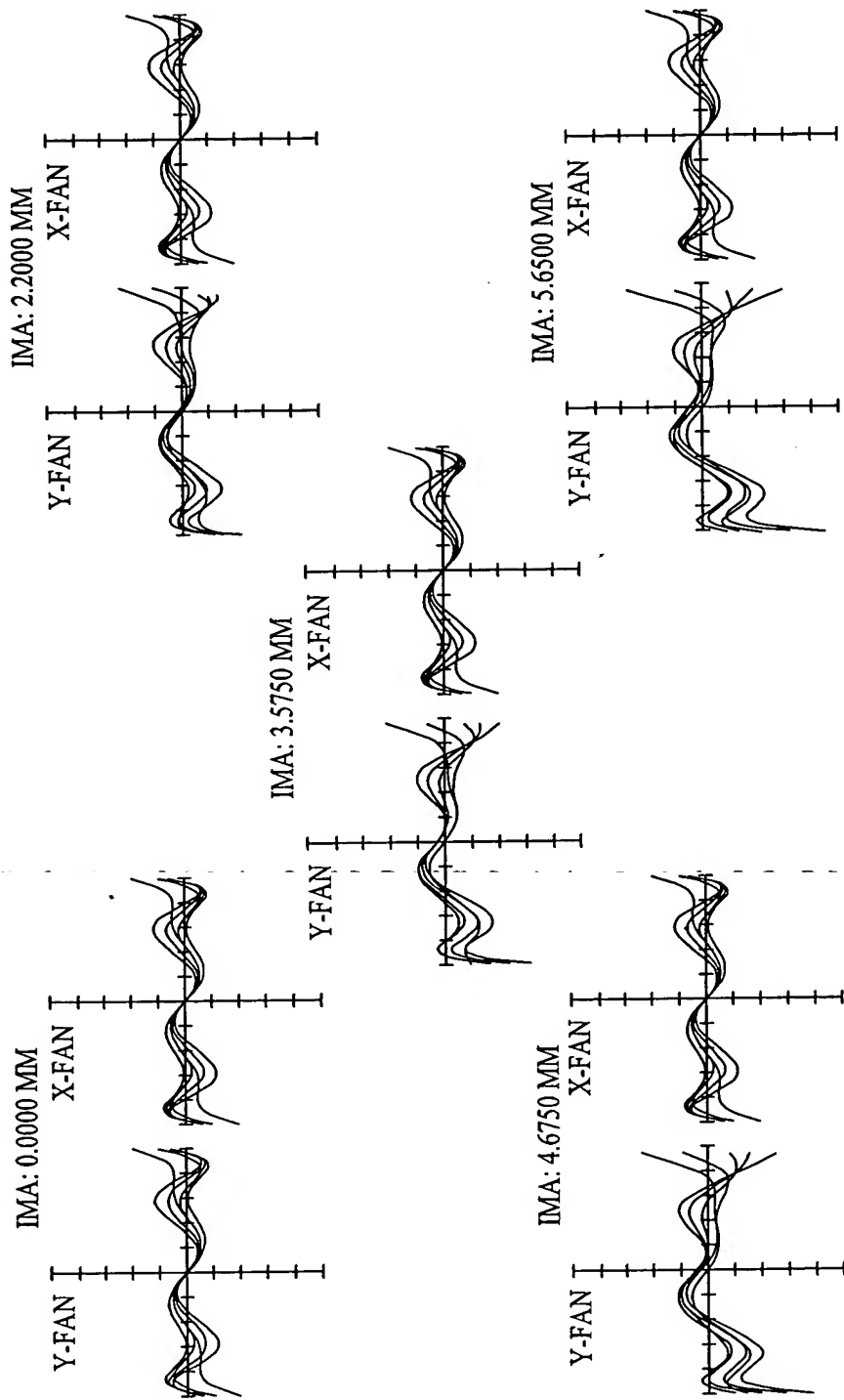
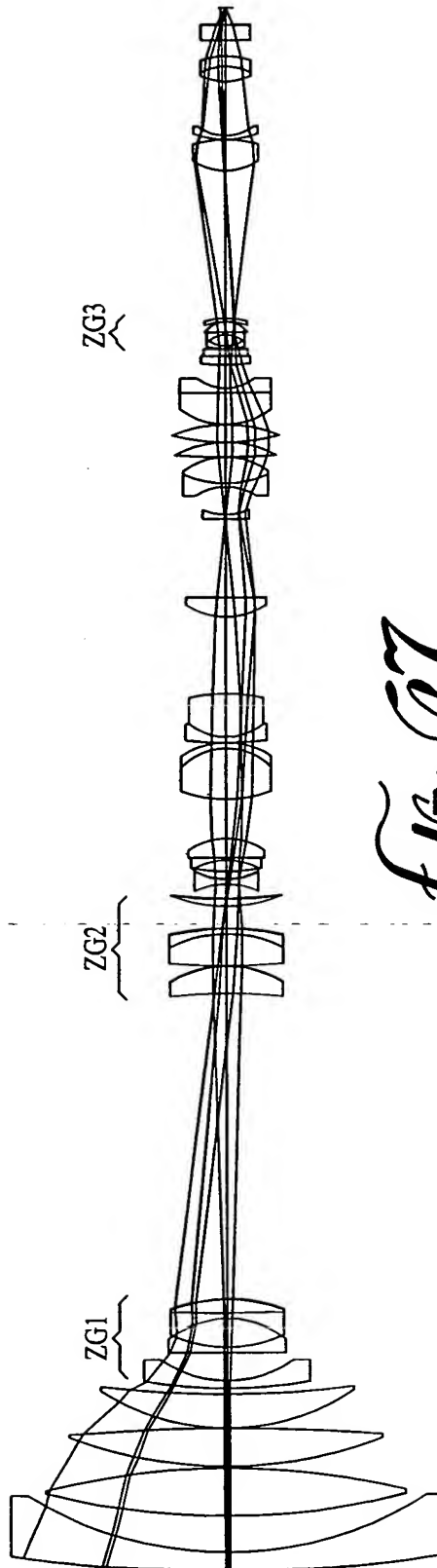


Fig. 00

WAVE LENGTHS RANGE 460-644 NM  
MAXIMUM VERTICAL SCALE +/- 100 MICRONS

EFL = 7.47MM



EFL = 2983MM

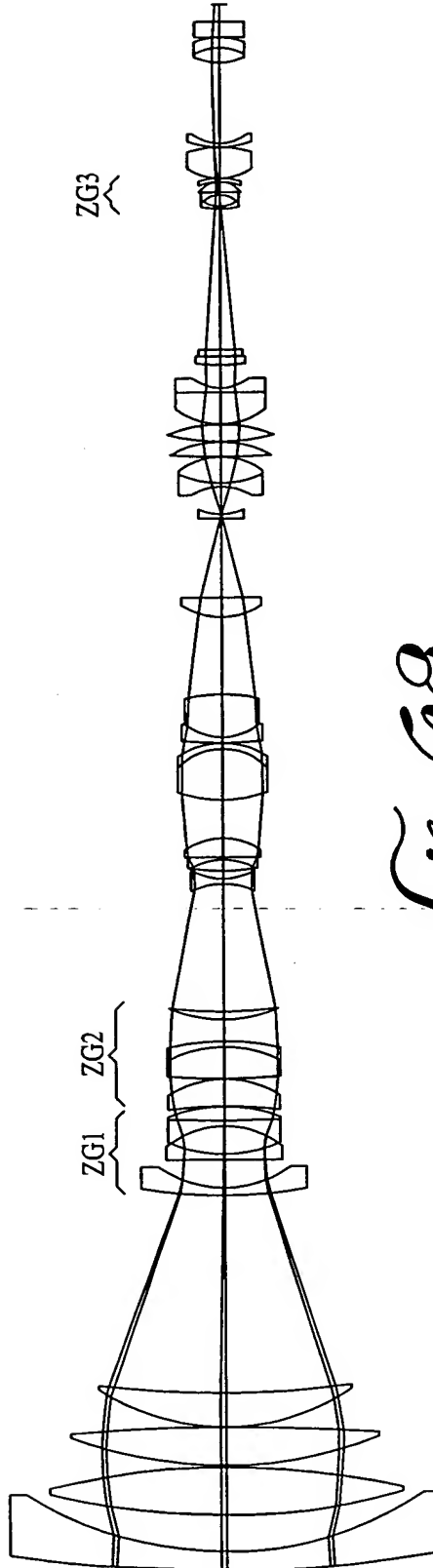
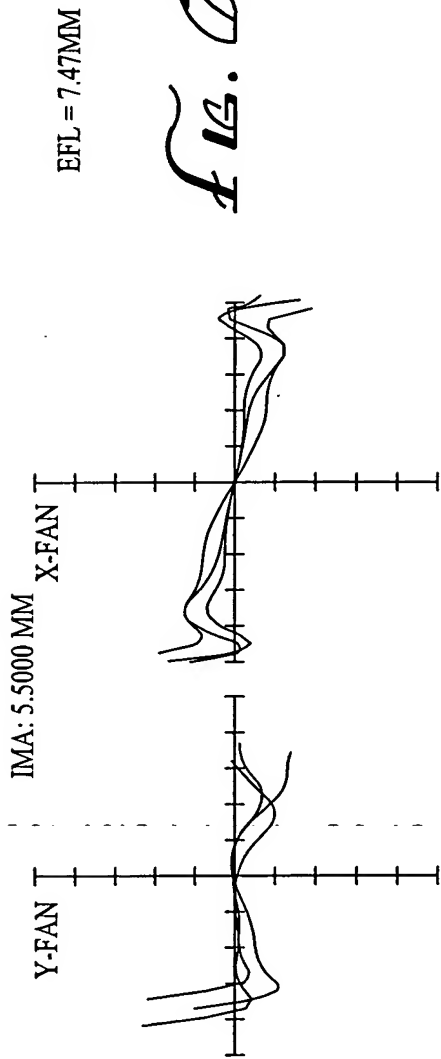
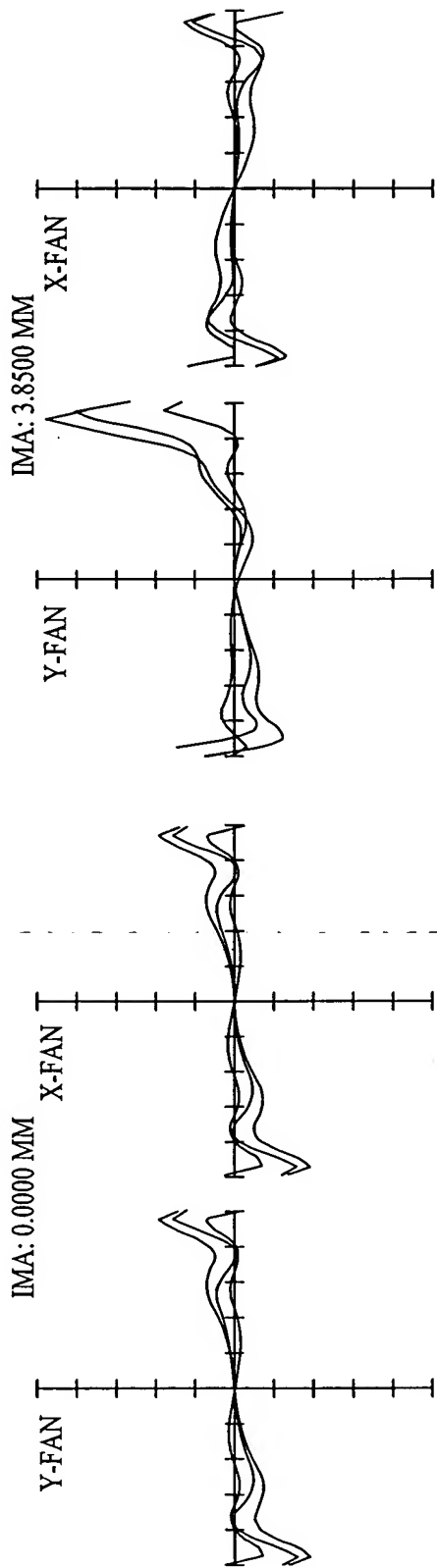


Fig. 08



WAVE LENGTHS RANGE 480-644 NM  
MAXIMUM VERTICAL SCALE +/- 100 MICRONS

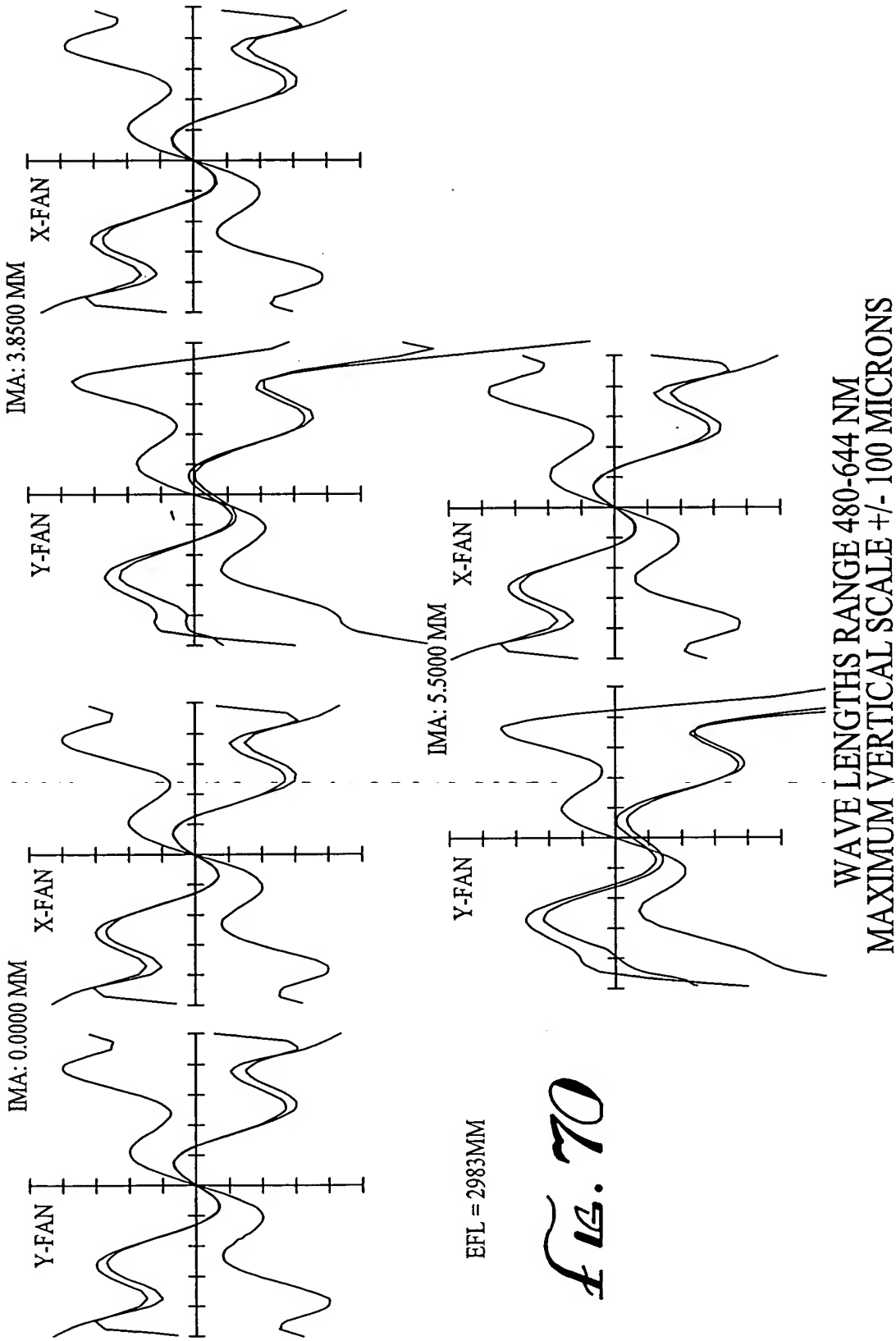


Fig. 70

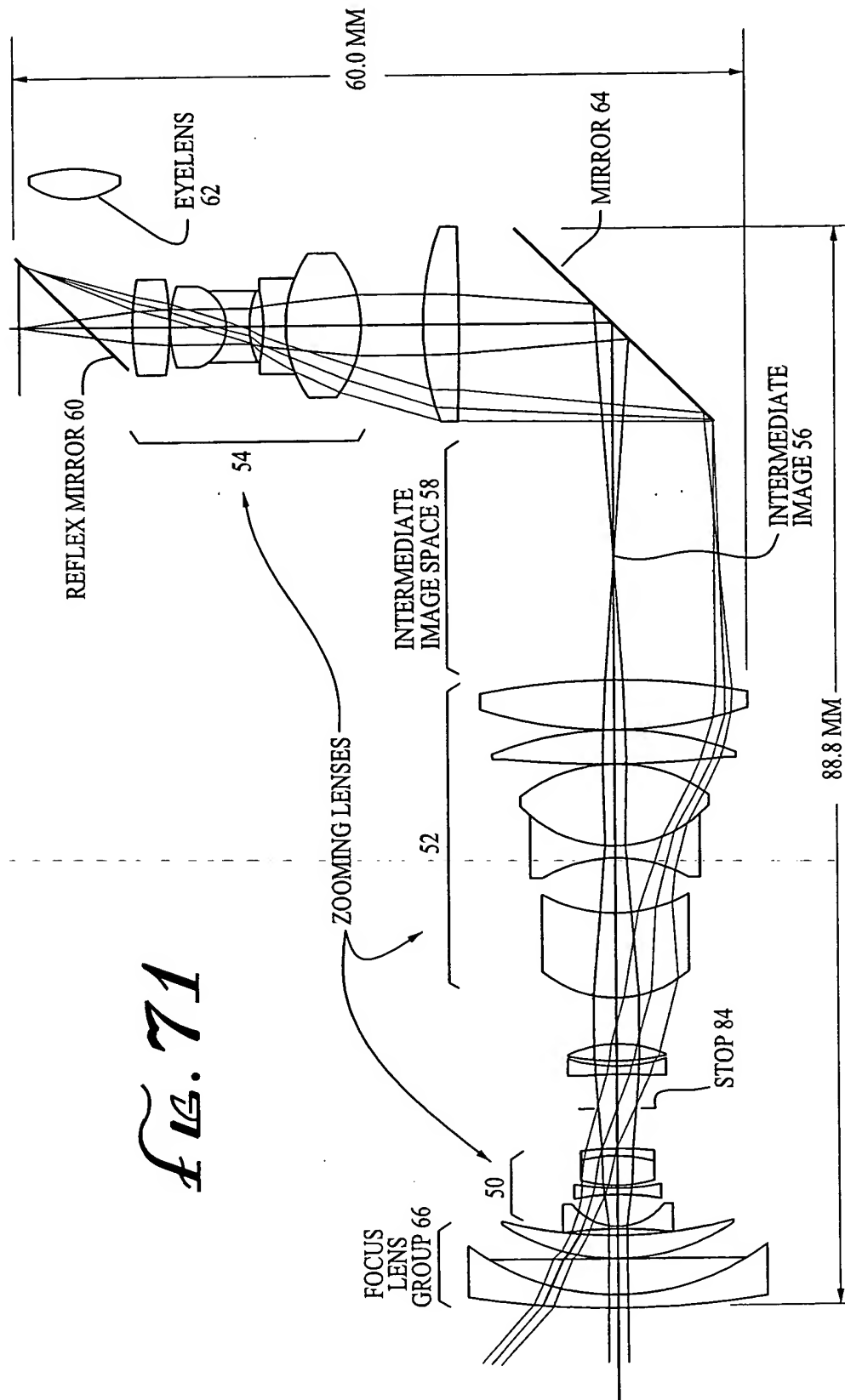


FIG. 71

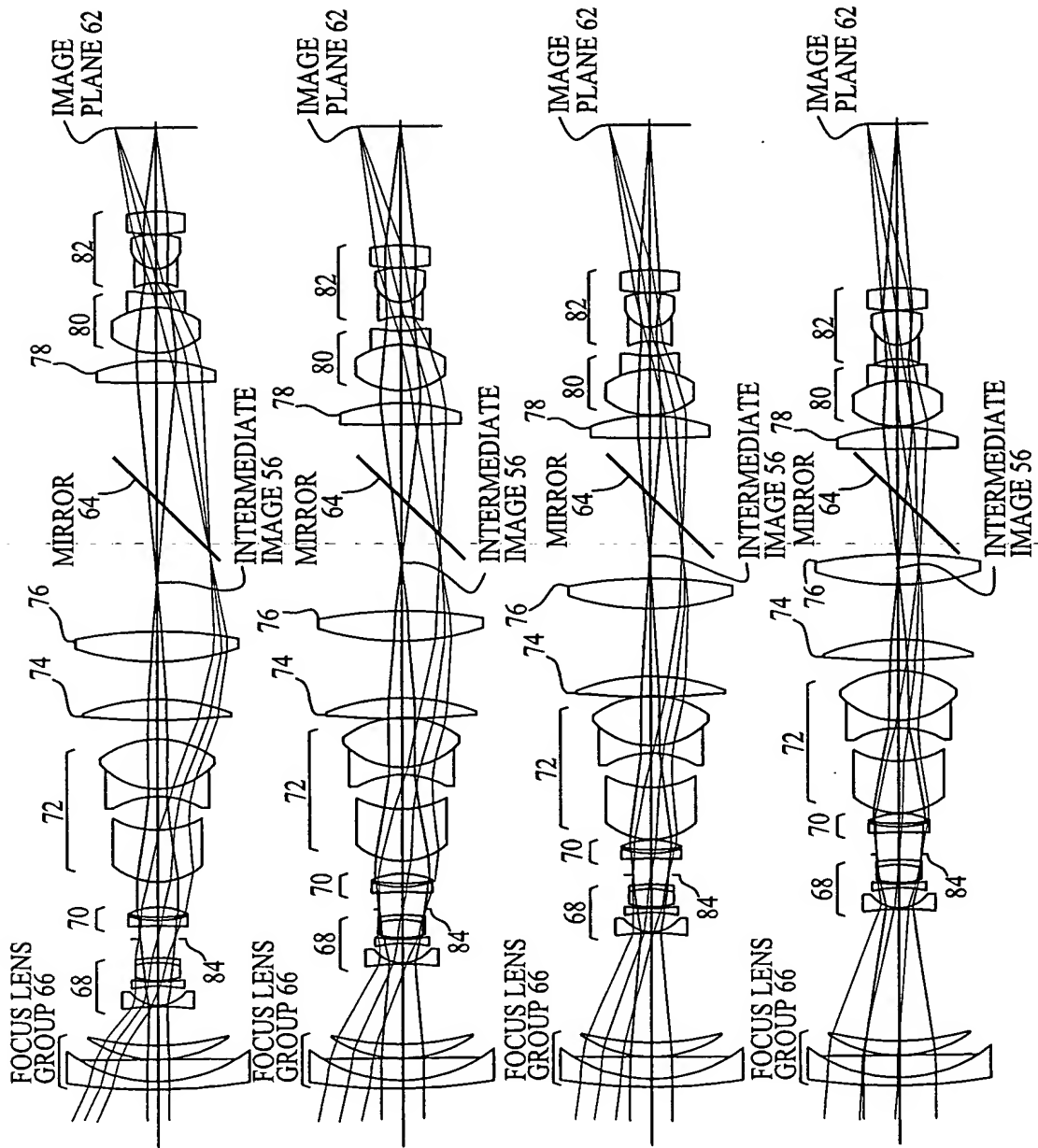


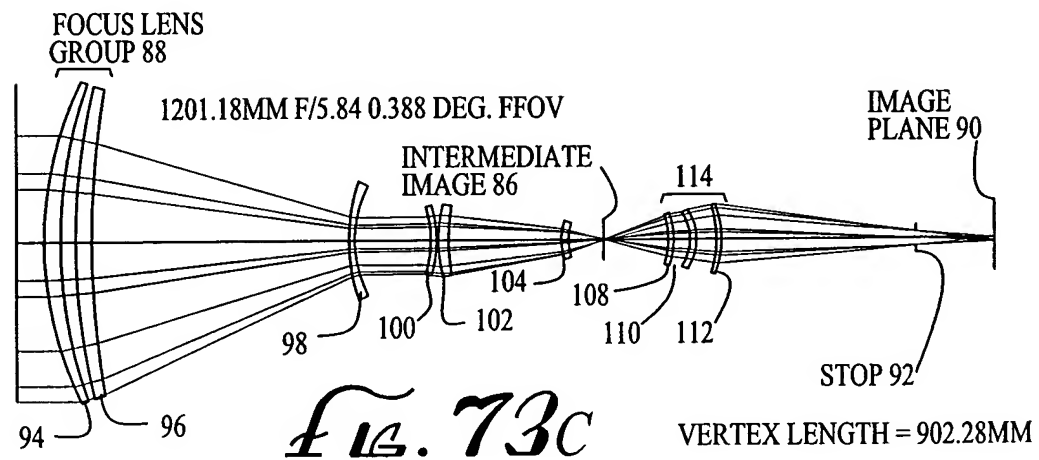
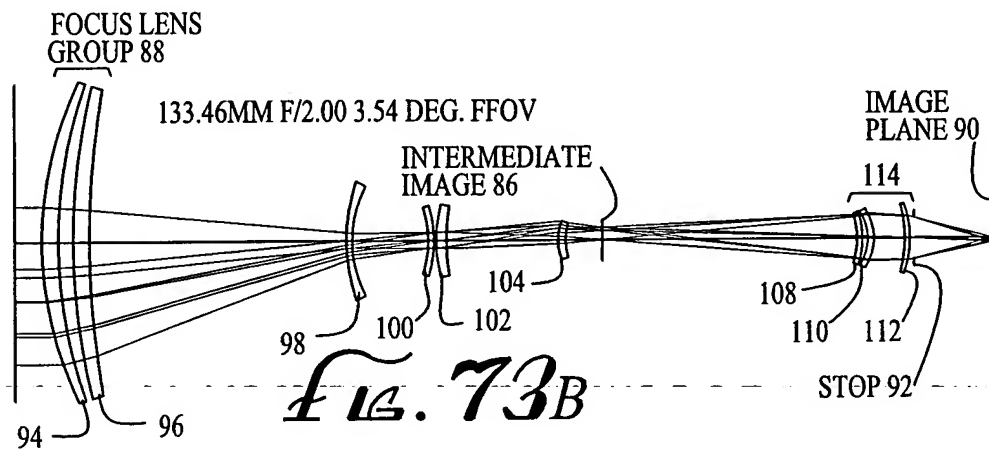
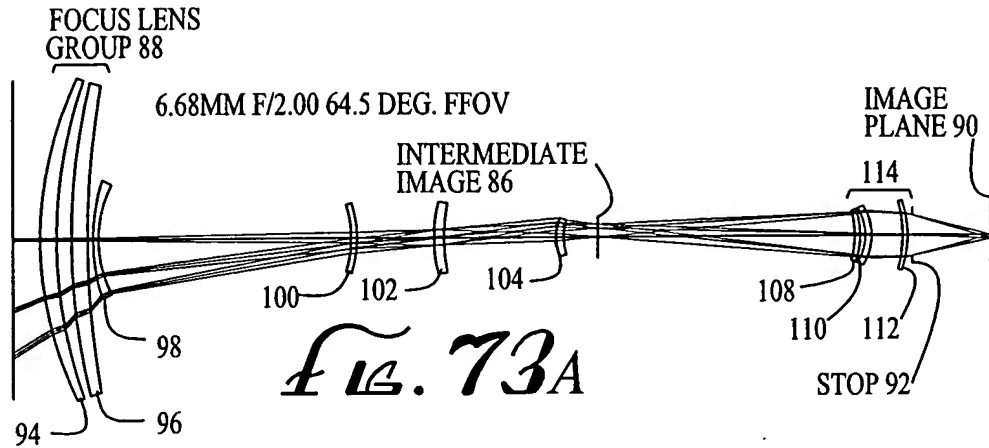
Fig. 72A

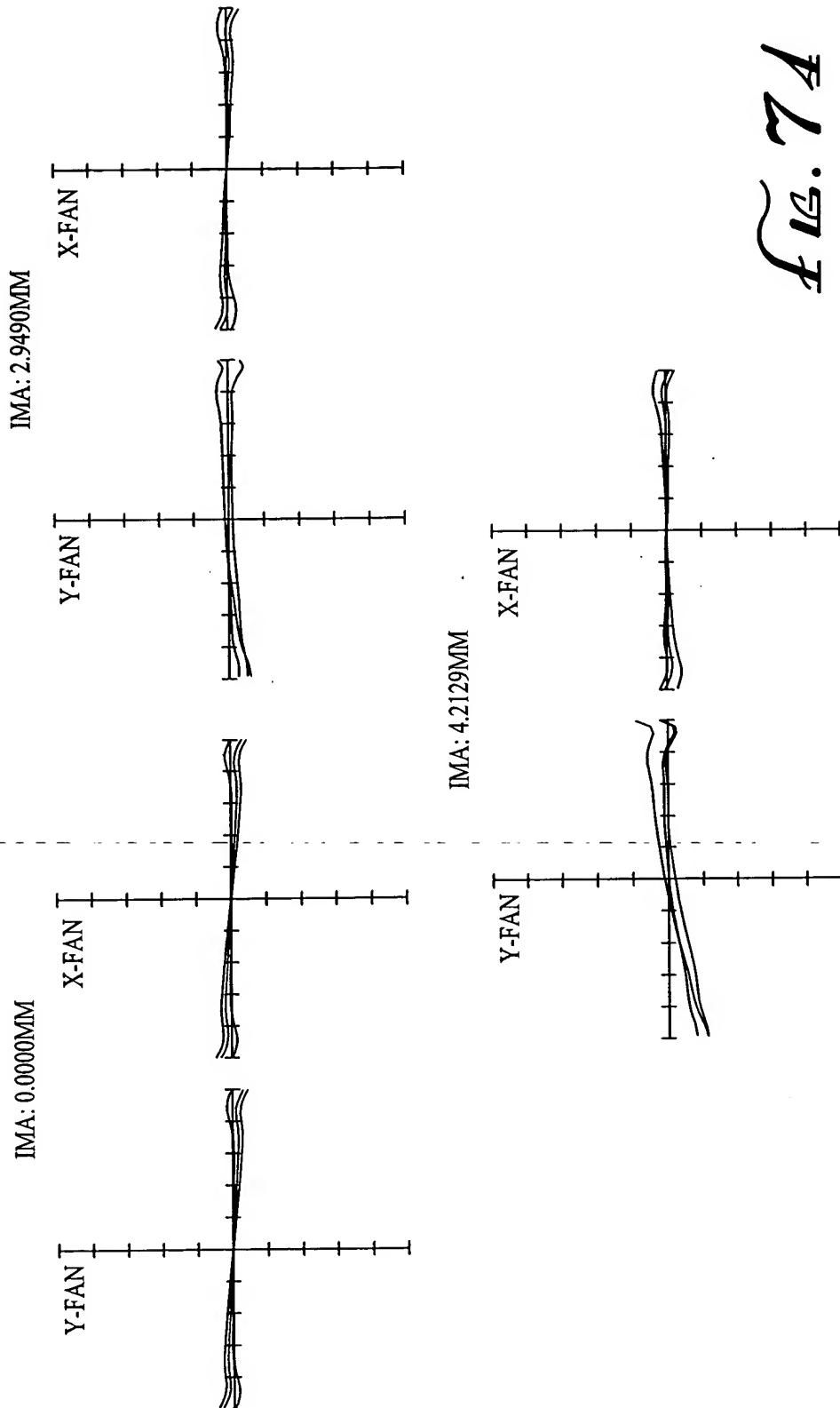
Fig. 72B

Fig. 72C

Fig. 72D







WAVELENGTH RANGE 8-12 MICRONS  
MAXIMUM VERTICAL SCALE +/- 200 MICRONS

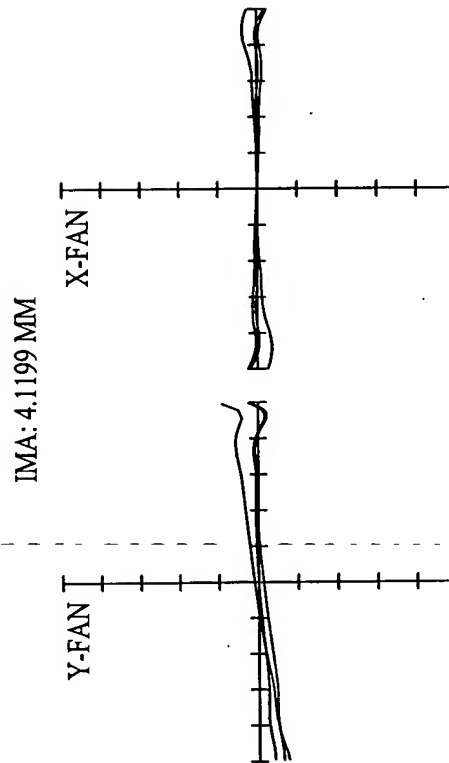
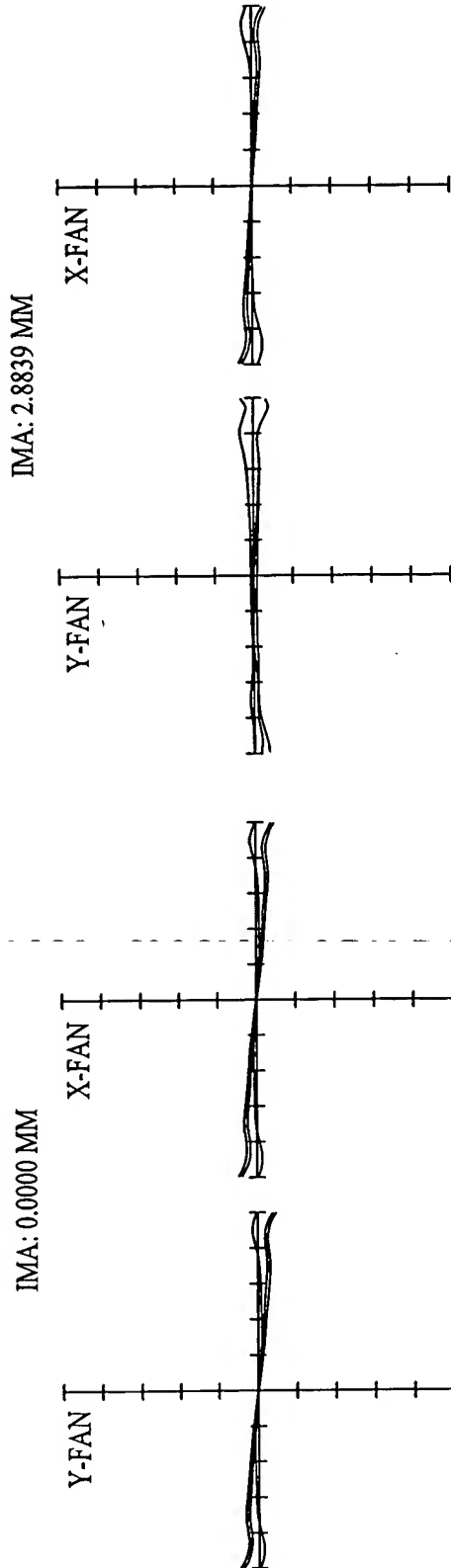
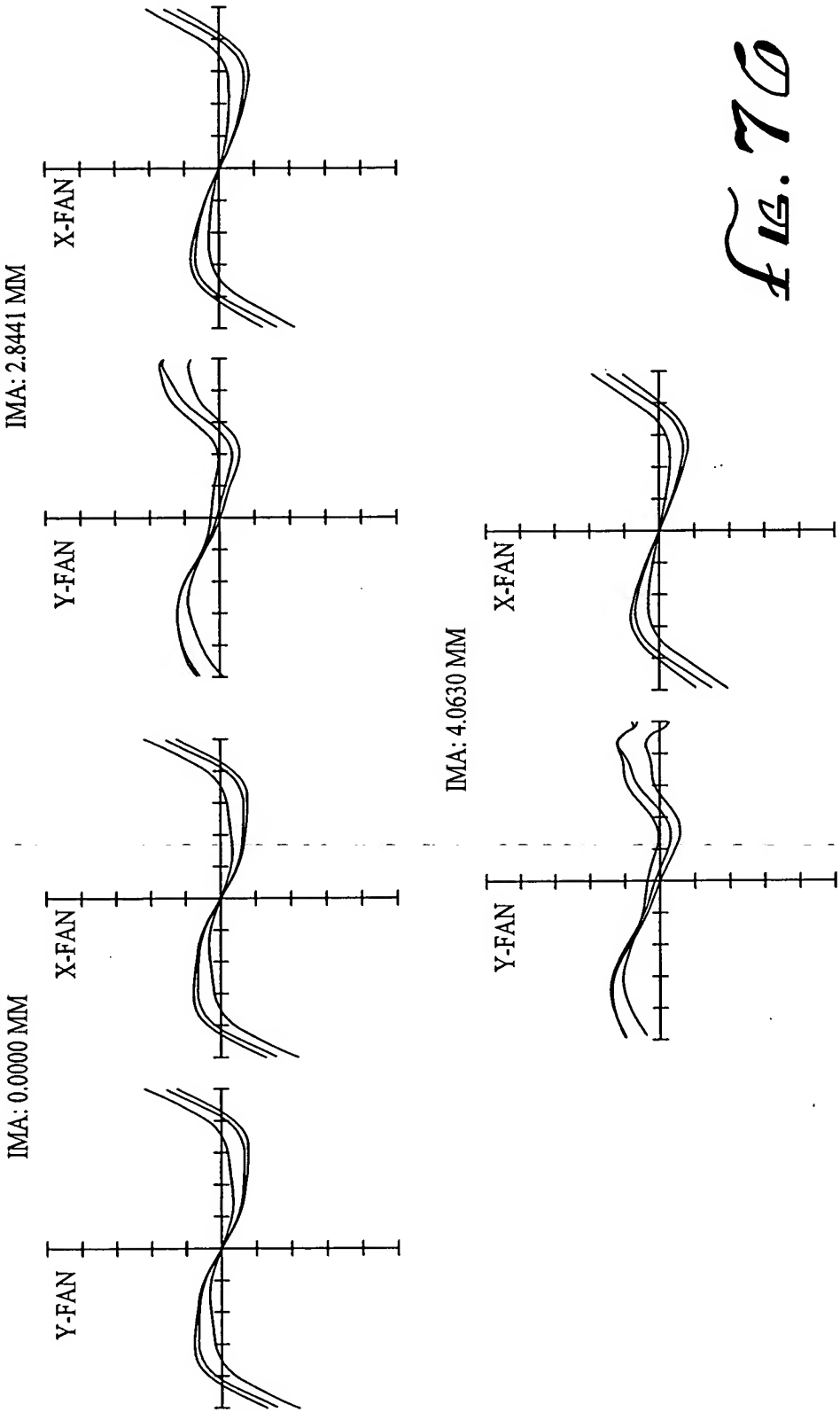


Fig. 75

WAVELENGTH RANGE 8-12 MICRONS  
MAXIMUM VERTICAL SCALE +/- 200 MICRONS



WAVELENGTH RANGE 8-12 MICRONS  
MAXIMUM VERTICAL SCALE +/- 200 MICRONS